PACiS SCE

System Configuration Editor

SCE/EN T/C80

Technical Guide

Schneider Electric

PACiS SCE
TECHNICAL GUIDE

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SAFETY & HANDLING

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1. INTRODUCTION

This document is a chapter of PACiS System Configuration Editor PACiS SCE V4.8 documentation. It describes the safety, handling, packing and unpacking procedures applicable to PACiS SCE software tools.

2. SAFETY

WARNING: THIS SAFETY SECTION SHOULD BE READ BEFORE COMMENCING ANY WORK ON THE EQUIPMENT.

2.1 Health and Safety

The information in the Safety Section of the product documentation is intended to ensure that products are properly installed and handled in order to maintain them in a safe condition. It is assumed that everyone who will be associated with the equipment will be familiar with the contents of the Safety Section and all Safety documents related to the PC and Communication networks.

2.2 Explanation of symbols and labels

The meaning of symbols and labels may be used on the equipment or in the product documentation, is given below.

2.3 Installing, Commissioning and Servicing

Equipment operating conditions

The equipments (PC supporting PACiS SCE) should be operated within the specified electrical and environmental limits.

Fibre optic communication

Optical LED transceivers used in Switch boards are classified as IEC 825-1 Accessible Emission Limit (AEL) Class 1 and consequently considered eye safe.

Optical power meters should be used to determine the operation or signal level of the device.

2.4 Decommissioning and Disposal

Disposal:

It is recommended to avoid incineration and disposal of the PACiS SCE CD-ROM. The product should be disposed of in a safe manner.

3. GUARANTEES

The media on which you received Schneider Electric software are warranted not to fail executing programming instructions, due to defects in materials and workmanship, for a period of 90 days from date of shipment, as evidenced by receipts or other documentation. Schneider Electric will, at its option, repair or replace software media that do net execute programming instructions if Schneider Electric receive notice of such defects during the guaranty period. Schneider Electric does not guaranty that the operation of the software shall be uninterrupted or error free.

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In any application, including the above reliability of operation of the software products can be impaired by adverse factors, including -but not limited- to fluctuations in electrical power supply, computer hardware malfunctions, computer operating system, software fitness, fitness of compilers and development software used to develop an application, installation errors, software and hardware compatibility problems, malfunctions or failures of electronic monitoring or control devices, transient failures of electronic systems (hardware and/or software), unanticipated uses or misuses, or errors from the user or applications designer (adverse factors such as these are collectively termed "System failures").

Any application where a system failure would create a risk of harm to property or persons (including the risk of bodily injuries and death) should not be reliant solely upon one form of electronic system due to the risk of system failure to avoid damage, injury or death, the user or application designer must take reasonably steps to protect against system failure, including -but not limited- to back-up or shut-down mechanisms, not because end-user system is customised and differs from Schneider Electric testing platforms but also a user or application designer may use Schneider Electric products in combination with other products.

These actions cannot be evaluated or contemplated by Schneider Electric; Thus, the user or application designer is ultimately responsible for verifying and validating the suitability of Schneider Electric products whenever they are incorporated in a system or application, even without limitation of the appropriate design, process and safety levels of such system or application.

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1. INTRODUCTION TO PACiS

The PACiS range will continue to be expanded. The general features of PACiS will also be enhanced, as we are able to adopt new technology solutions.

For up-to-date information on any PACiS product, visit our website: www.schneider-electric.com

2. INTRODUCTION TO PACiS GUIDES

This version of the PACiS SCE documentation refers to version PACiS V4.8. The guides provide a functional and technical description of the PACiS System Configuration Editor - PACiS SCE adapted to PACiS V4 (IEC61850 Station Bus) and a comprehensive set of instructions for the PACiS SCE's use and application.

PACiS SCE guides is divided into two volumes, as follows:

- Operation Guide: includes information on the application of the PACiS SCE and a technical description of its features. It is mainly intended for protection & control engineers concerned with the selection and application of the PACiS SCE for the Configuration of PACiS solution or of any of the PACiS equipment.
- Technical Guide: contains information on the installation and commissioning of the PACiS SCE, and also a section on fault finding. This volume is intended for site engineers who are responsible for the installation, commissioning and maintenance of the PACiS SCE application.

2.1 Chapters description

2.1.1 Chapter Safety (SA)

This chapter contains the safety instructions, handling and reception of electronic equipment, packing and unpacking parts, Copyrights and Trademarks.

2.1.2 Chapter Introduction (IT)

This is this document containing the description of each chapter of the PACiS SCE guides. It is a brief introduction to PACiS SCE capabilities.

2.1.3 Chapter Functional Description (FT)

This chapter contains a description of the product. It describes the functions included in PACiS SCE.

2.1.4 Chapter Technical Data (TD)

This chapter contains the technical data including, accuracy limits, recommended operating conditions, ratings and performance data.

It also describes environment specification, compliance with technical standards.

2.1.5 Chapter HMI, Local control and user interface (HI)

This chapter contains the operator interface description, Menu tree organisation and navigation, Setting/configuration software.

2.1.6 Chapter Installation (IN)

This chapter contains the installation procedures.

2.1.7 Chapter Commissioning record sheet (RS)

This chapter provides detailed record sheets to commission PACiS SCE.

2.1.8 Chapter Settings (ST)

This chapter contains the list of the setting with defaults values and range of the PACiS SCE.

2.1.9 Chapter Maintenance, Fault finding, Repairs (MF)

This chapter provides advice on how to identify failure modes, fault codes and describes the recommended repair actions.

2.1.10 Chapter Problem analysis (PR)

This chapter provides practical examples of problem solving and company contact information. It includes all information on the self-checking features and diagnostics of PACiS SCE.

2.1.11 Chapter Lexicon (LX)

This chapter contains lexical description of acronyms and definitions of the PACiS SCE.

2.2 Operation guide

This guide contains the following chapters:

SA, IT, TD, FT, HI, AP, LX

2.3 Technical guide

This guide contains the following chapters:

SA, IT, TD, FT, IN, ST, RS, MF, PR, LX

3. INTRODUCTION TO PACiS SCE APPLICATIONS

The PACiS SCE Applications are mainly defined in the Application chapter (AP) of each PACiS equipment (MiCOM C264/C264P, PACiS GTW, PACiS OI).

TECHNICAL DATA

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1. SCOPE OF THE DOCUMENT

This document is a chapter of PACiS System Configuration Editor PACiS SCE V4.8 documentation. It describes the Technical Data (SCE/EN TD) of this set of software applications.

2. REQUIREMENTS

For the minimum hardware requirements to operate the PACiS SCE application, please refer to the table that follows:

Type of PC	Standard desktop with CPU Xeon 2.8 GHz
RAM	2048 Mbytes or more
Hard Disk	80 GB - FT32 format or more.
CD-ROM Reader	
Operating System	Windows 2003, or Windows XP Professional SP3
Applications	XML parser
Graphics	VGA screen 256 colours minimum, resolution 1024*768 or higher
Optional	Ethernet port, USB port, CD-Writer for database exchange

You can install the SCE on the same PC that has the Operator Interface (OI) and the System Management Tool (SMT).

3. CAPABILITIES

The capabilities of the PACiS SCE application allow you to define the maximum configuration of a PACiS project. You can find a description of the capacity limits of the different devices of a PACiS project in the chapter PACiS SCE/EN MF. Please refer to the topic, Capacity limits.

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FUNCTIONAL DESCRIPTION

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1. SCOPE OF THE DOCUMENT

This document is a chapter of the PACiS SCE V4.8 documentation. It is the functional description of PACiS System Configuration Editor software application dedicated to the PACiS system and sub-systems.

2. PACiS SCE ARCHITECTURE

2.1 General Description

The System Configuration Editor (PACIS SCE) is the central tool in charge to manage the PACiS system database for the PACiS equipment. The system configuration database contains the configuration data for the PACiS system equipment:

- PACiS OI the Operator Interface
- PACiS SMT the System Management Tool that download Databases
- PACiS GTW the Tele control gateway
- MiCOM Computers C264 & C264P

The PACIS SCE allows some authorised personnel to interact with the PACiS system configuration:

- modelling of coherent system configuration data: devices, electrical topologies, graphical mimics, automations
- generation of configuration data-file for IEC61850 devices of the PACiS project

To generate any equipment database, the PACIS SCE manages:

- Inner data of the device itself (structure and parameters values)
- Exchange data of the device with other system devices
- Exchange data of the device with non-system devices

With the 3rd case, the PACIS SCE manages the communication with all non-PACiS devices with typically IED or protection devices on Legacy BUS or system network. It is only by the configuration of communication mapping that PACIS SCE can handle non-PACiS devices.

2.2 Functional Specification

PACiS System Configuration Editor is a tool that:

- helps in definition/edition of equipment data with specific editors (attribute, mimic, ISaGRAF) or with queries on configuration
- generates equipment databases

The definition of data is done firstly by the definition by developer experts of templates or models of data. These templates are then stored and delivered in PACIS SCE libraries. In a second time, the models can be loaded and instanced as a clever kind of duplication to create object data customised to the application case.

When all data of the concrete case are defined, the PACIS SCE generates a coherent set of databases that can be loaded into each system device.

2.2.1 PACIS SCE Users

Control access of an operator is realised through a login and password capture.

Different levels of operators are distinguished depending on its role:

- ***Level 1*** allows the modification of an existing configuration by adjustment of parameters, settings or graphical representations. The users of level 1 can also add or remove elements derived from the user template libraries. They can generate PACiS application databags. Level 1 users are typically final users.
- ***Level 2*** allows the modification of an existing configuration by adding or removing elements derived from the user templates libraries. They can break the links between the templates and the instantiated objects. Like level 1 users they can generate PACiS application databags. Level 2 users are Integrators and VARs.
- ***Level 3*** users have the capability to modify and create new templates derived from the existing template libraries. They can generate PACiS application databags but also template libraries. User of level 3 will be all T&D-EAI PACiS specialists.
- ***Level 4*** users are PACiS SCE experts. They can modify and create the templates directly from the structural database elements. Their PACIS SCE user level allows also the management of all template databases and the administration of the structural database. The level 4 users are the PACiS SCE administrators.

Such categories is only an outline of PACIS SCE users since several of its tools thanks to specific editors, or report managers, can provided the records needed by other tasks: commissioning cubicle, mapping extraction, etc.

2.2.2 PACIS SCE Template & Object

A **database** is basically a collection of persistent data. In the PACIS SCE framework, a database is a collection of **objects**. Any object has its specific **attributes**, organised in categories and subcategories. The objects are organised in the database by following pre-defined association rules.

The **structural database** defines **object types** and **association types**. Association types are **hierarchical link types** and **relation link types** between object types. Hierarchical links are defined for father/child associations. Relation links are defined for other associations, and may hold attributes. **Cardinalities** are defined for all associations.

A **library database** contains **templates**. A template is a collection of objects/associations instantiated from the structural database or from others templates.

A **configuration database** contains objects/associations instantiated from types of the structural database or from templates. It also contains its own templates, created specifically for the configuration, or imported from a library database. A configuration database defines all data needed by system devices to feel up customer application.

All the database elements support internationalisation (multiple languages).

2.2.3 Database creation process

To create the database downloaded to system devices, the common way is to:

- Import a template from an external library into current database (in its template area)
- Customise the template if needed in DB template area
- Instantiated the template from template to Object part of the database
- Feel up predefined attribute known as degree of freedom (for example the name)
- Generate devices databases

The link between template and instantiated object can be kept. Nevertheless this relation can be broken for deep object modifications.

During all this creation process, the PACIS SCE does a check of data coherency with its Data Model. The checks are made with templates and objects. The checks are made during configuration edition and/or by a check action. They are done on:

- Attribute input
- Relation creation
- Generation

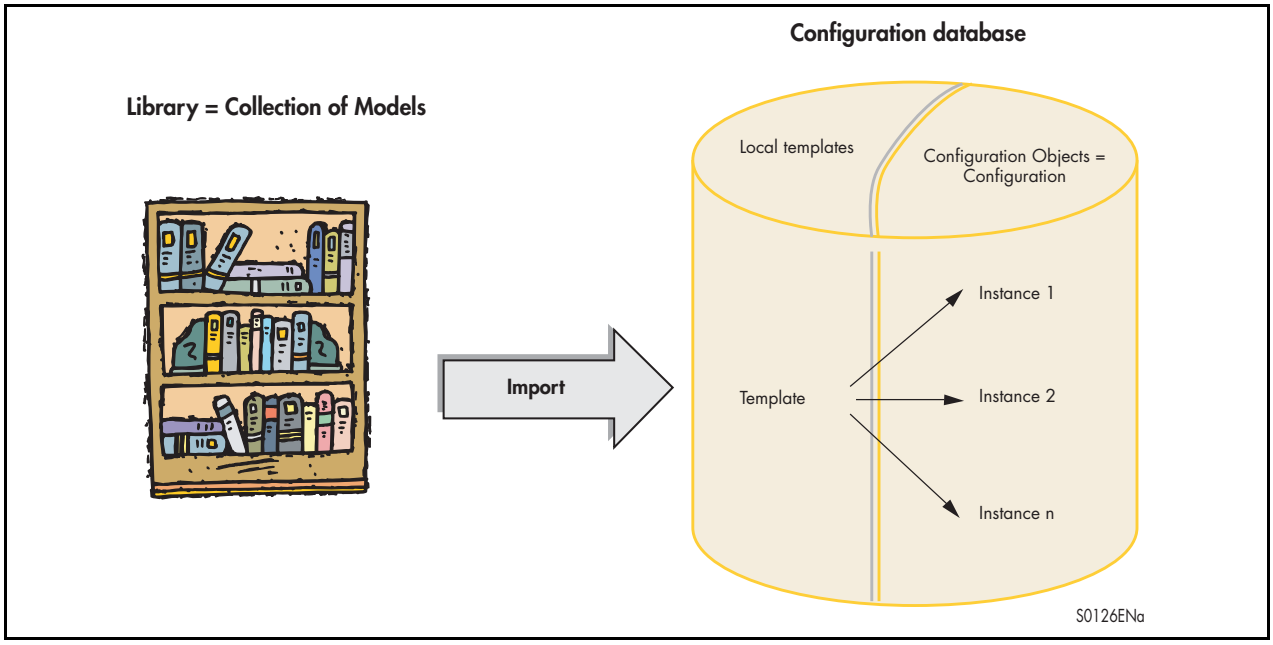

FIGURE 1: CONFIGURATION PROCESS

2.2.4 Version & release

Along time, system's device features have evolution and their inner data base structure is subject to modification. PACiS SCE need to feel the new requirement and has also evolutions and corrections referenced by version.

A unique reference determines the coherent set of system equipment database and soft/hard equipment that PACIS SCE can be used.

PACIS SCE can be compared two referenced versions of a configuration.

2.3 External Interfaces

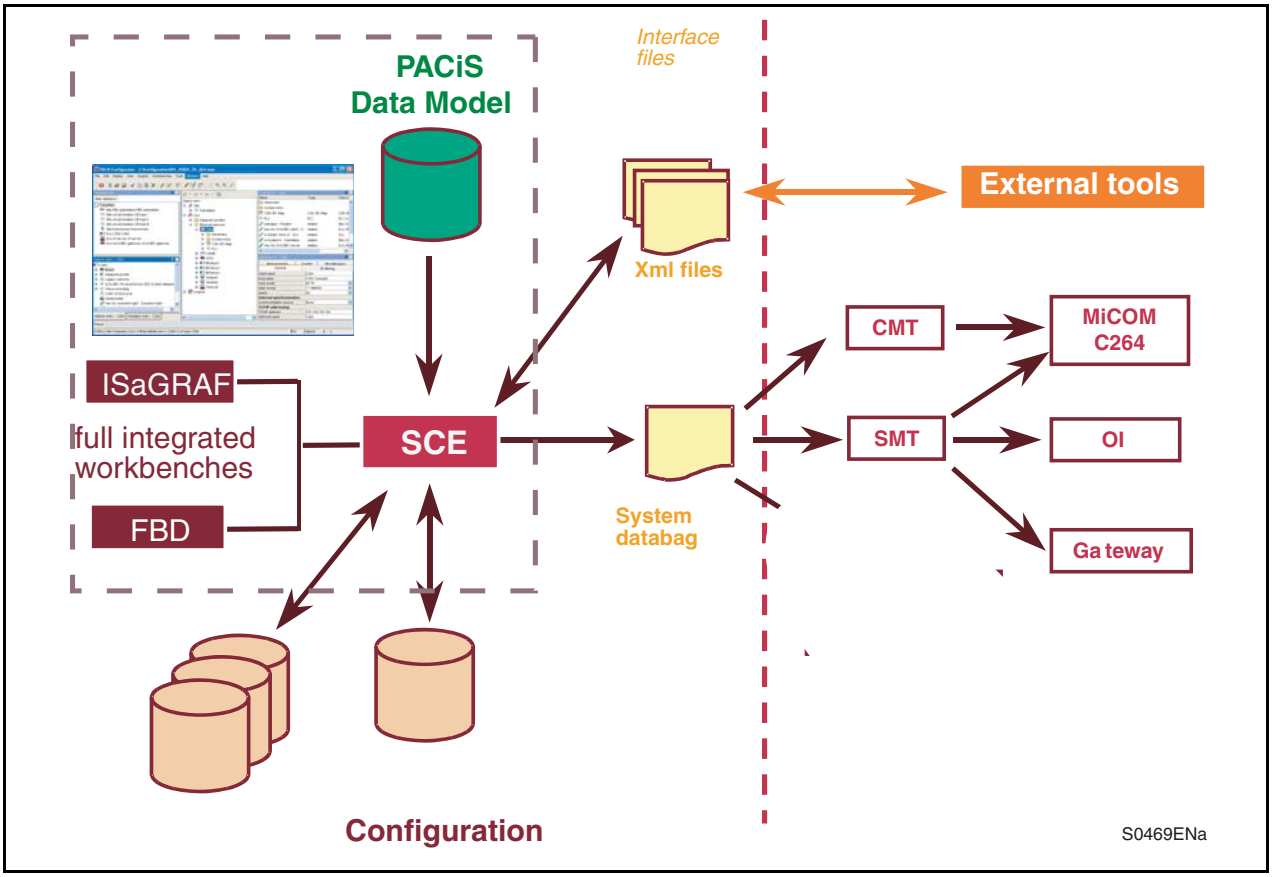

FIGURE 2: EXTERNAL INTERFACES

There is no software interfaces between PACIS SCE and other external tools or PACiS devices.

External interfaces are implemented through files:

- Xml files: the user can export or import a whole configuration or only a subset. A PACIS SCE exchange Xml format is defined for describing files which are:
- exported from PACIS SCE to an external tool.
- imported from an external tool to PACIS SCE.
- System databag: from a referenced version of a configuration, PACIS SCE generates an application databag for each PACiS devices. The application databags are bagged in a System databag. The system databag are used by PACiS SMT to download application databag in each PACiS devices. This system databag could be used by PACiS simulator tools.
- Reports: the user selects a whole configuration or only a subset and asks a report. A predefined report pdf format is delivered with PACIS SCE.

NOTES: All IEC61850 clients must be defined in the SCD file during an export, in order to know the defined client / server relation(s).

From a SCL point of view, an IEC61850 client is an IED with an “Access Point” structure without “Server” element.

The MiCOM Px3x / Px4x Phase 2 provide ICD files in which Virtual Inputs are defined (a Virtual Input is an abstract element which allows to define an attachment to a GOOSE in MiCOM IED).

The SCE, during an ICD import, creates these Virtual Inputs in a specific area of the IED IEC61850 mapping. Then, these Virtual Inputs can be associated to datapoints (using relations) defined in the electrical area.

2.4 Human Interface

2.4.1 PACIS SCE General Display

At initial start-up or after installation of new version, the PACIS SCE application display can be seen as represented below (as far as user has all PACIS SCE rights and licences). It should be noticed that all parts are not necessary needed for all kind of user.

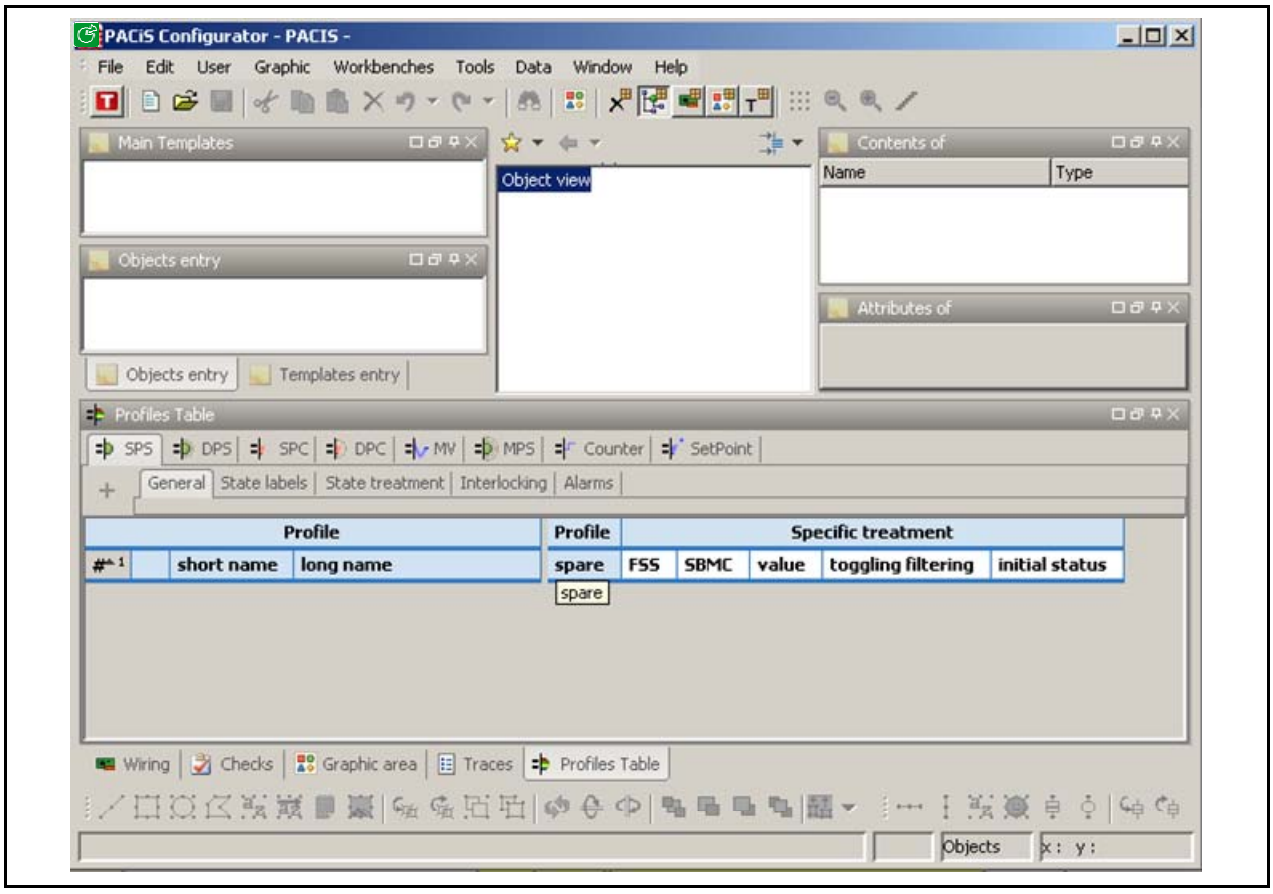

FIGURE 3: PACiS SCE DISPLAY AT START-UP

The staring view is empty. Explanation of each area is given below with some information on it.

For displaying information it is needed to load a database. After such database load, the PACIS SCE application looks as below.

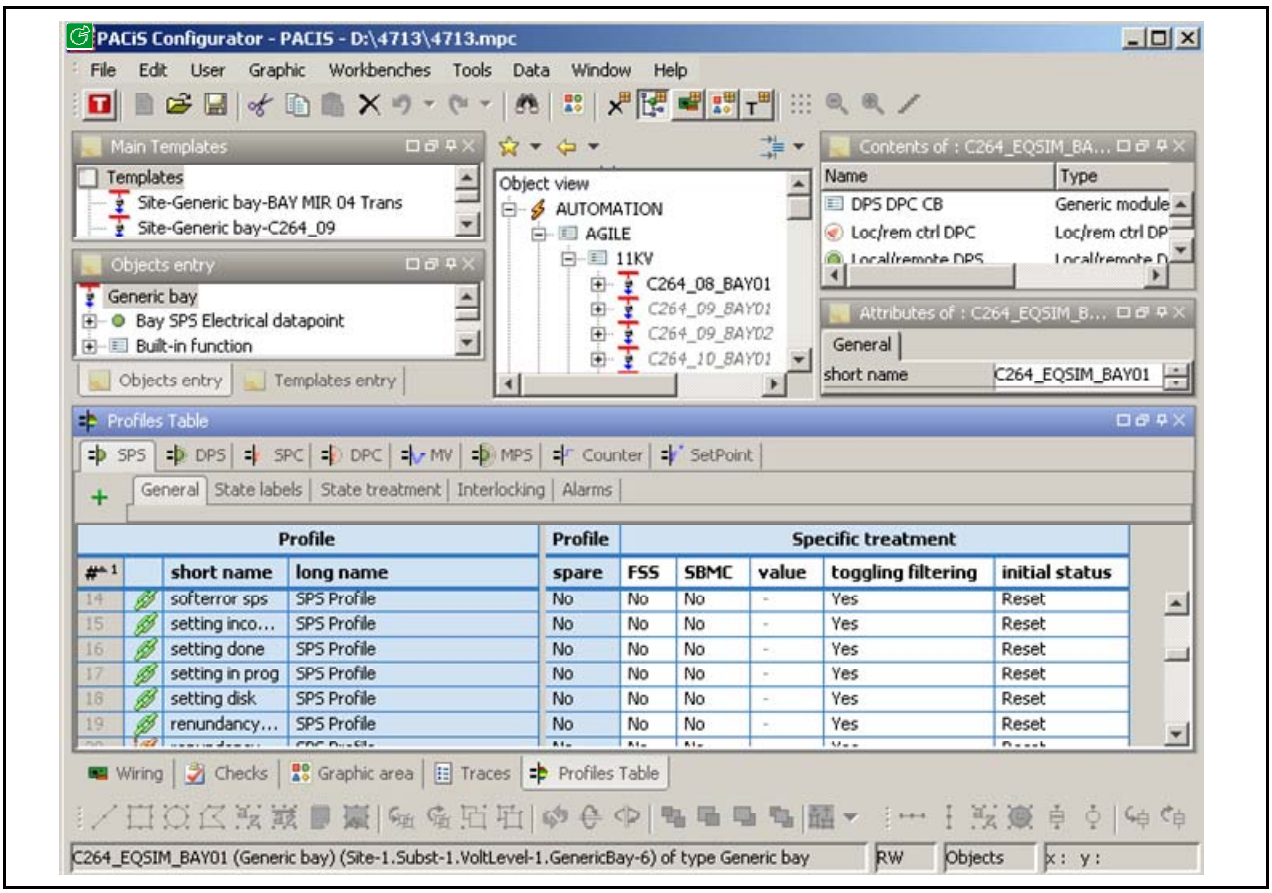

FIGURE 4: PACiS SCE DISPLAY WITH LOADED DATABASE

The display is composed of 5 areas:

- Title Bar
- Menu Bar
- Tool Bar
- Docking Window or common work area composed of several on line optional and customisable areas.
- State Bar

2.4.2 Working or Docking Window

By default or selecting all items in Menu Bar/Windows option items, the working area is displayed with all areas as below:

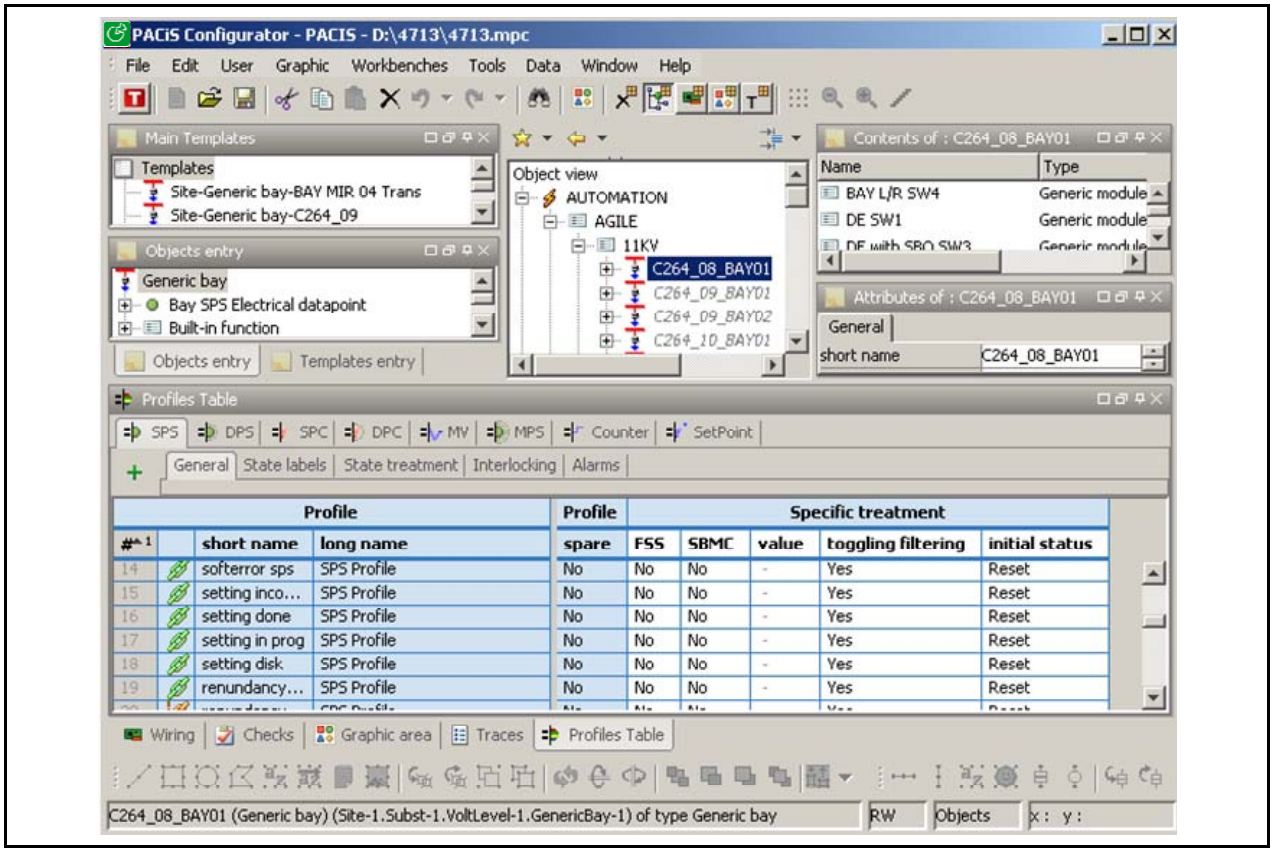

FIGURE 5: DOCKING WINDOW

Areas are viewers driven by:

- Navigator perspective Tree Viewer
- Mimic Editor

When selecting object (click, enter) all views are “refreshed” with corresponding data:

- Components List (Object/relations under selected object)
- Attributes List (of object selected)
- Template Entry List (of existing template of that can be added under selected object from DB template list)
- Object Entry List (of objects that can be added under selected object from conceptual modeling)

2.4.3 Management under Windows XP

2.4.3.1 Windowing

The PACIS SCE Application follows windowing behaviour. As presented before it has all option for iconify, maximise/minimise, or close/exit.

When window is minimised it can be resized by its border or corner, and displaced by dragging of title bar. This behaviour is also down with sub windows.

2.4.3.2 ToolTip

When mouse pointer remains on tool bar icon or menu, a tool tip appears with a short message explaining the function.

INSTALLATION

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1. SCOPE OF THE DOCUMENT

This document is a chapter PACiS System Configuration Editor (SCE) V4.8 documentation binder. It describes the installation of this engineering tool.

An outline helps to define the SCE context. PC requirement for a correct use is then presented. The installation of SCE and its tools is then given with few necessary setting. The end of document gives indication for handling install problem or uninstall product.

1.1 PACiS SCE OUTLINE

Schneider Electric's years of experience in monitoring and control system has learnt that any system part needs to be highly configurable to match a specific electric substation case, and its evolution along years. This needed flexibility is not only into the change of parameters value but also in the structure of data to manage along several devices.

As consequence, system devices use downloaded database compare to fixed devices that use setting upon a rigid structure of data. The PACiS SCE equipment is the Editor of all data and the generator creating the Databases for all PACiS equipment.

1.1.1 PACiS SCE Managed System Equipment

PACiS SCE is defined to handle all system structured data and to generate Databases loaded on PACiS System main equipment:

- ⇒ PACiS OI the Operator Interface for local HMI
- ⇒ PACiS SMT the System Management Tool that download Databases
- ⇒ PACiS ES the Equipment Simulator
- ⇒ PACiS GTW the separate Tele control Interface to SCADA
- ⇒ MiCOM C264 & C264PComputers

The tool is designed to be used for several system equipment working together with their exchange communication data, only one of them. For example it is able to generate database of one MiCOM C264 used in stand alone.

1.1.2 Version & release

Along time, system's devices features have evolution and their inner data base structure is subject to modification. PACiS SCE need to feel the new requirement and has also evolutions and corrections referenced by version. The software version is seen all along installation and is expressed for example by:

4.52.3

4: the 1st number is the PACiS system version with fixed features set and Data model version

52: the 2nd number is an iteration number for the given version (that includes minor evolution)

3: the ending number is optional release on generators.

2. REQUIREMENTS

PACiS SCE can be installed onto desktop or laptop PC depending of the use of it:

- ⇒ checking data
- ⇒ parameter modification
- ⇒ prototyping substation
- ⇒ template/model development
- ⇒ full substation data definition
- ⇒ equipment database generation

PACiS SCE V4.8 runs on Microsoft XP Pro SP3. There is not special requirement on its installation.

2.1 Hardware

For data base development purpose, the needed PC is defined with:

- ⇒ CPU Core II duo 2.66 GHz
- ⇒ RAM: 2048 GB or more.
- ⇒ Hard disk: 80 GB with still 40MB free on drive C
- ⇒ Screen display: 1024*768 resolution minimum

Installation of the package needs an administrator logging.

Stand-alone PACiS SCE version uses less than 200MB but adding documentation and versioned databases grows quickly the needed space.

2.2 PACiS SCE License

Software Licence Agreement

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3. Reverse compile, reverse engineer, disassemble, modify, adapt, list, print or translate or otherwise tamper with the whole or any part of the Licensed Programme(s).
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2. Modify, merge or combine the whole or any part of the Licensed Programme with any other software or documentation.
3. Use the Licensed Programme on behalf of, or make available the same to, any third party.

2.2.6 The Licensee SHALL

1. Keep confidential the Licensed Programme and limit users of the same to those of its employees agents and sub-contractors who either have a need to know or who are engaged in the use of the Licensed Programme.

2. Maintain an up-to-date written record of the number of copies of the Licensed Programme and their locations and upon request forthwith produce such record to the Supplier, and

3. Without prejudice to the foregoing take all such other steps as shall from time to time be necessary to protect the confidential information and intellectual property rights of the Supplier in the Licensed Programme.

4. The Licensee shall inform all relevant employees agents and sub-contractors that the Licensed Programme constitutes confidential information of the Supplier and that all intellectual property rights therein are the property of the Supplier and the Licensee shall take all such steps as shall be necessary to ensure compliance by its employees agents and sub-contractors within the provisions of this clause.

2.2.7 Warranty

Subject to the exceptions set out in this clause and the limitations upon its liability in Clause 5 below

1. The Supplier warrants that the media upon which the Licensed Programme is stored will for a period of 90 days from the date the Supplier accepts an order for a Licensed Programme be free from defects in material design and workmanship and that the Licensed Programme will conform to the Supplier's specifications.

2. Subject to clause 4.3 below the Supplier shall remedy any breach of the above warranties by the replacement of the Licensed Programme free of charge.

3. The Supplier shall have no liability to remedy a breach of warranty where such breach arises as a result of:

   - The improper use, operation, or neglect of the Licensed Programme, or the computer equipment it is used on.

   - A modification of the Licensed Programme, or its merging in whole or in part with any other software.

   - Any repair, adjustment, alteration or modification of the Licensed Programme by any other person than the Supplier, without the Supplier's prior written consent.

4. Subject to the foregoing, all conditions, warranties, terms and undertakings, express or implied, statutory or otherwise, in respect of the Licensed Programme are hereby excluded.

2.2.8 Limitations of Liability

1. The following provisions set out the Supplier's entire liability (including any liability for the acts and omissions of its employees, agents and sub-contractors) to the Licensee in respect of any breach of its contractual obligations arising under this agreement and any representation, statement or tortuous act or omission including negligence arising under or in connection with this Licence Agreement.

2. Any act or omission on the part of the Supplier or its employees agents or sub-contractors falling within clause 5 above shall for the purposes of this clause be known as an 'Event of Default'.

3. The Supplier's liability to the Licensees for death or injury resulting from its own negligence or that of its employee's agents or sub-contractors, shall not be limited.

4. Subject to the limits set out in clause 5.4 below the Supplier shall accept liability to the Licensee in respect of damage to the tangible property of the Licensee resulting from the negligence of the Company or its employees, agents or sub-contractors.

5. Subject to the provisions of clause 5.3 above the Supplier's entire liability in respect of any Event of Default shall be limited to damages of an amount equal to:

   - The case of an Event of Default falling within 5.3 above the purchase price of the Licensed Programme.

   - The case of any other Event of Default the licence fee paid in respect of the Licensed Programme.

6. Subject to clause 5.2 above the Supplier shall not be liable to the Licensee in respect of any Event of Default for loss of profits, goodwill or any type of special indirect or consequential loss (including loss or damage suffered by the Licensee as a result of an action brought by a third party) even if such loss was reasonably foreseeable or the Supplier had been advised of the possibility of the Licensee incurring the same.

2.2.9 Multi-User

The Supplier in consideration of an enhanced licence fee paid on its own or as part of a purchase price may authorise the Licensee to use the Licensed Programme simultaneously on:

1. Any single computer system that contains up to 5 central processing units (CPUs).

2. Any single computer system that contains up to 10 central processing units (CPUs).

2.2.10 General

This Licence Agreement overrides all prior written and oral communications regarding the Licensed Programme with the Licensee, and sets out the entire agreement between the Supplier and the Licensee. In the event of a dispute between the Supplier and the Licensee relating to this Licence Agreement, the Licensee agrees to submit to the jurisdiction of the French Courts or to the Courts of other legal systems that may from time to time be elected at the sole discretion of the Supplier. If any provision in this Licence Agreement is ruled invalid under any law, such provision shall be deemed modified or omitted only to the extent necessary to render it valid and the remainder of this Licence Agreement shall continue in full force and effect.

2.3 PACiS SCE delivery package

The package can be made by file or CD ROM. The package is composed of :

- An installer program and its compressed files. sce_x.y_installer.exe

In addition, depending of the licenses other software and libraries be provided:

- date bases libraries for substation *.mpl
- specific substation database *.mpc
- Install CD ISAGRAF Pro from ICS Triplex

3. PACiS SCE INSTALL

PACiS SCE software installation is decomposed in several parts depending of license agreement:

- ⇒ PACiS SCE software
- ⇒ PACiS SCE Report generating tools (option MSXML)
- ⇒ PACiS Operator Interface XML Parser (option DB for OI)
- ⇒ CJ International ISAGRAF Pro for configurable automation (option)
- ⇒ PACiS SCE Libraries of templates and data bases (option)

After the install few parameter need to be set as described in ST chapter

3.1 PACiS SCE Product Install

The versioned PACiS SCE software is installed via an Installation software. The default items are the most common.

3.1.1 Summary

Standard installation takes less than 5 minutes. It mainly creates 2 main directories where it decompresses delivered files:

- ⇒ C:\ Java\jnrex.y.z with Java n Run Time Engine (or JRE). For instance, j2r1.4.2
- ⇒ C:\Program files\PACiS\sce\x.y as versioned software product

3.1.2 PACiS SCE Detailled Installation Description

Initial step is to launch with a double click on **sce_installer_x.y.exe**.

It begins by InstallAnywhere software installation itself.

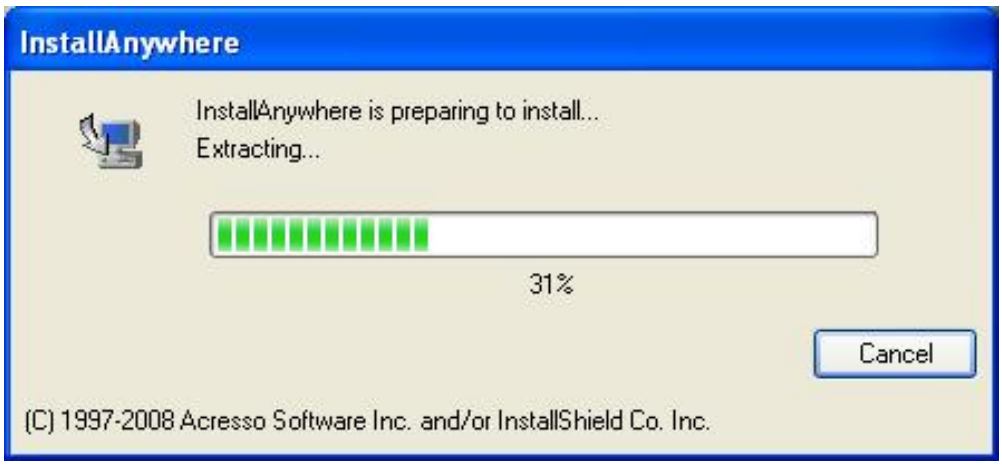


FIGURE 1 - INSTALLATION OF INSTALLER

The InstallAnywhere asks then for the appropriate installation language. A scrolling list shown in Fig 2 helps in selecting it.

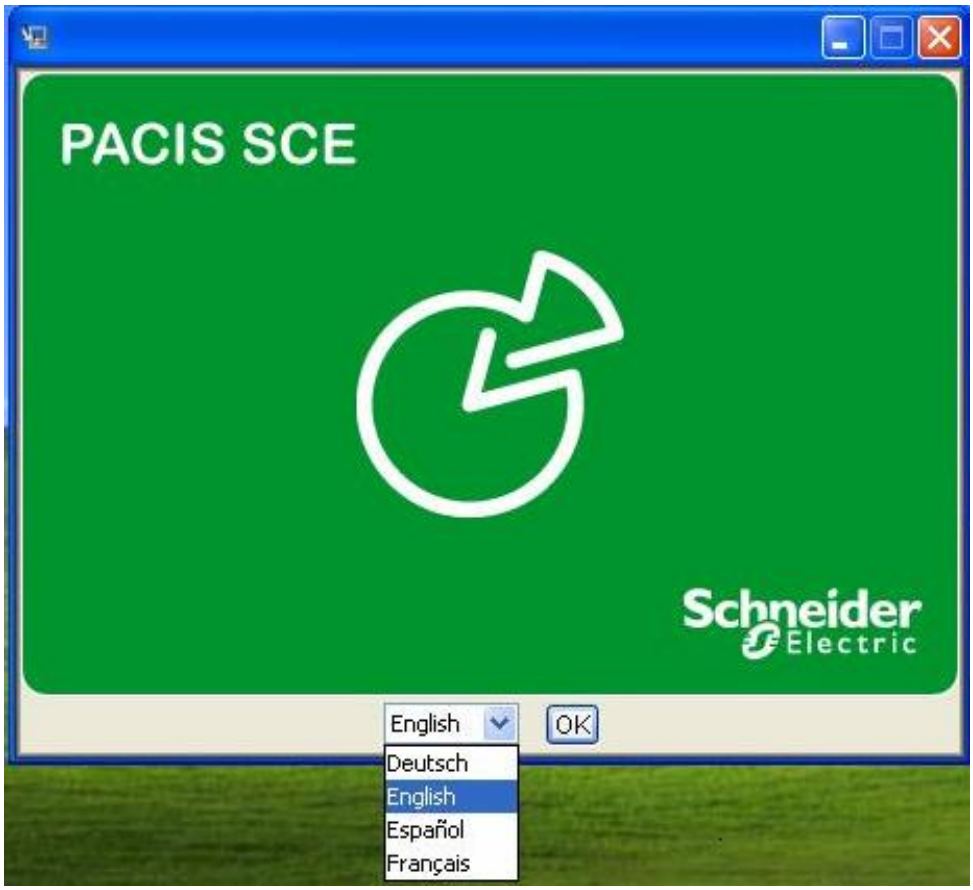


FIGURE 2 - SELECTING “INSTALLANYWHERE” INSTALLATION LANGUAGE

After language selection it is proposed to cancel installation or to go head clicking “Next”.

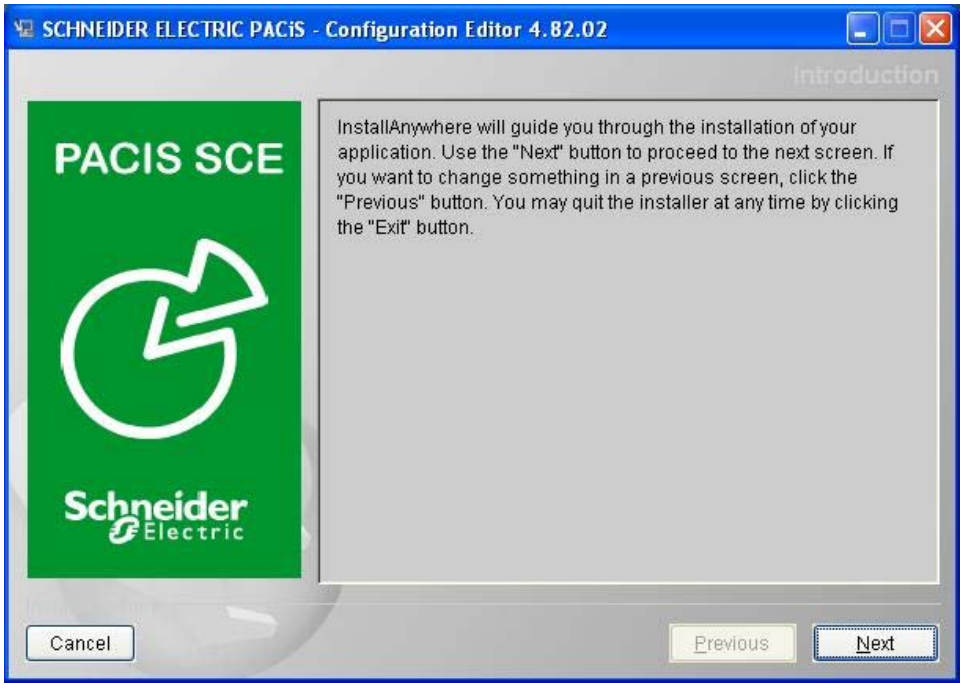

SCHNEIDER ELECTRIC PACiS - Configuration Editor 4.82.02
Introduction
PACIS SCE
Schneider Electric
InstallAnywhere will guide you through the installation of your application. Use the "Next" button to proceed to the next screen. If you want to change something in a previous screen, click the "Previous" button. You may quit the installer at any time by clicking the "Exit" button.
Cancel
Previous
Next

FIGURE 3 - INSTALLANYWHERE INSTALLATION COMPLETED

Next screen proposes to accept the terms of the Licence Agreement. Next button is enabled only if the choice “I accept…” has been done.

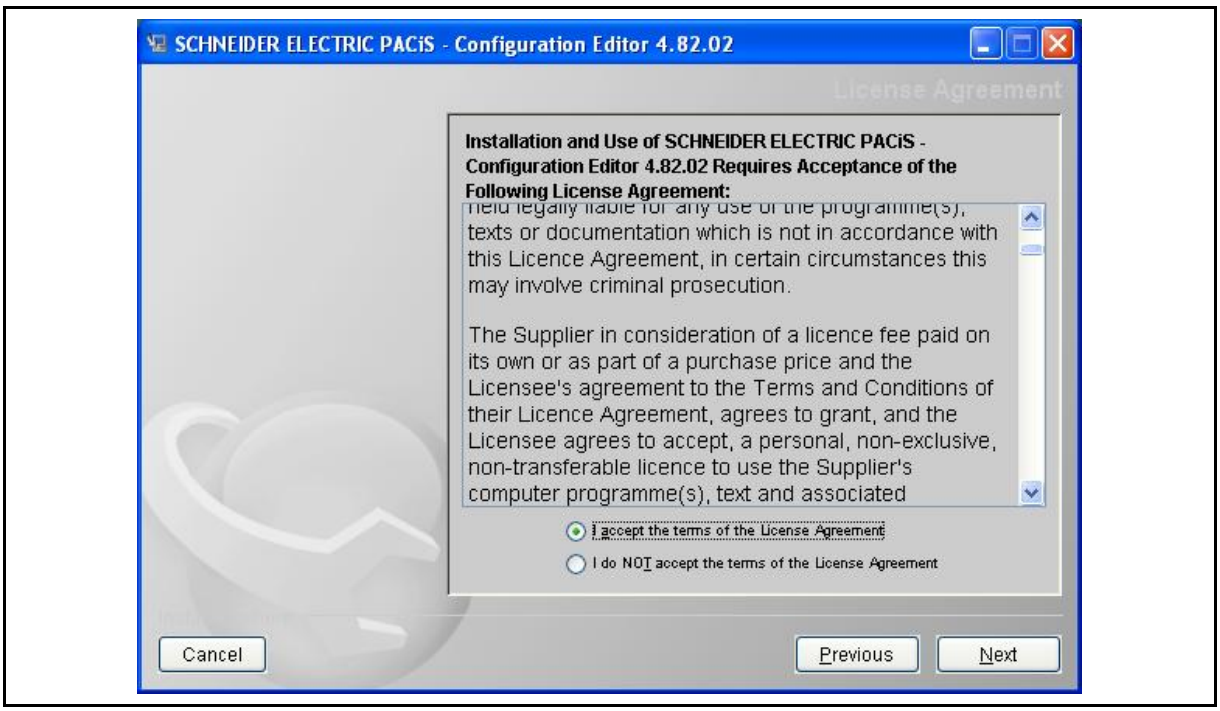

SCHNEIDER ELECTRIC PACiS - Configuration Editor 4.82.02
License Agreement
Installation and Use of SCHNEIDER ELECTRIC PACiS - Configuration Editor 4.82.02 Requires Acceptance of the Following License Agreement:
texts or documentation which is not in accordance with this Licence Agreement, in certain circumstances this may involve criminal prosecution.
The Supplier in consideration of a licence fee paid on its own or as part of a purchase price and the Licensee's agreement to the Terms and Conditions of their Licence Agreement, agrees to grant, and the Licensee agrees to accept, a personal, non-exclusive, non-transferable licence to use the Supplier's computer programme(s), text and associated
I accept the terms of the License Agreement
I do NOT accept the terms of the License Agreement
Cancel
Previous
Next

FIGURE 4 - LICENCE AGREEMENT

InstallAnywhere software is then installed and proposes the SCE installation. There is no choice for selecting the directory of Java Real-Time Engine (it is on C:\), but PACiS SCE can be installed anywhere thanks to a “Choose” option. Nevertheless it seems more appropriate to use an PACiS directory proposed by default, where other PACiS tools may be installed. All installation is then done on C: (80MB for SCE 40 MB for JRE libraries that do not change greatly in time, 150 MB for documentation).

Next screen propose to choose the PACiS SCE software main directory. A subdirectory will be anyway created, and named sce/x.y (with version reference). From this screen let point that window header or title has the version installed.

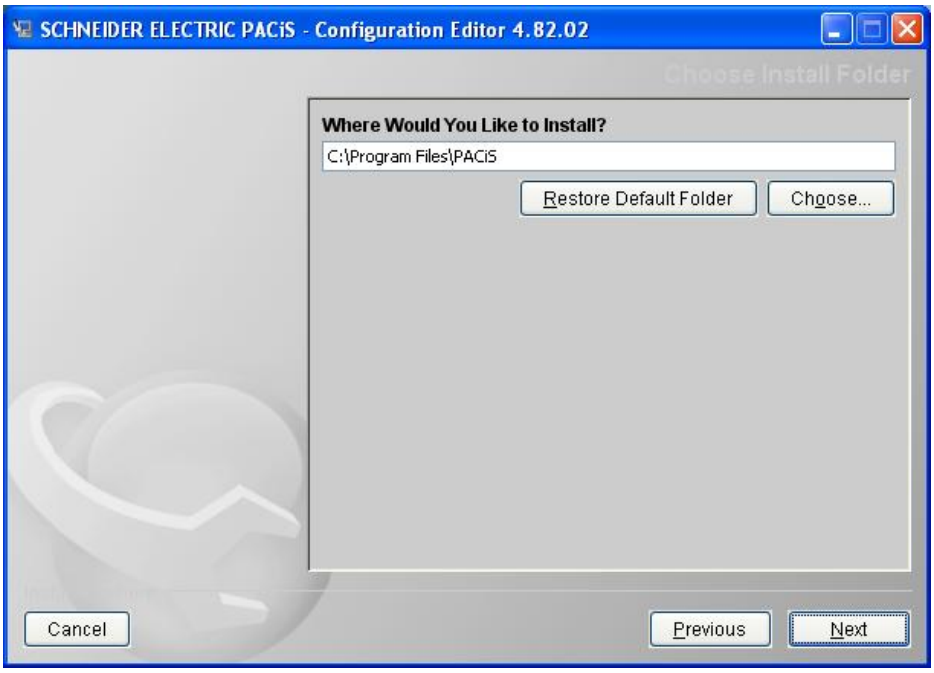


FIGURE 5 - PACiS SCE DIRECTORY SELECTION

Selecting the Next button leads to define what can be installed. It is proposed a Software, documentation or Software and Documentation installation.

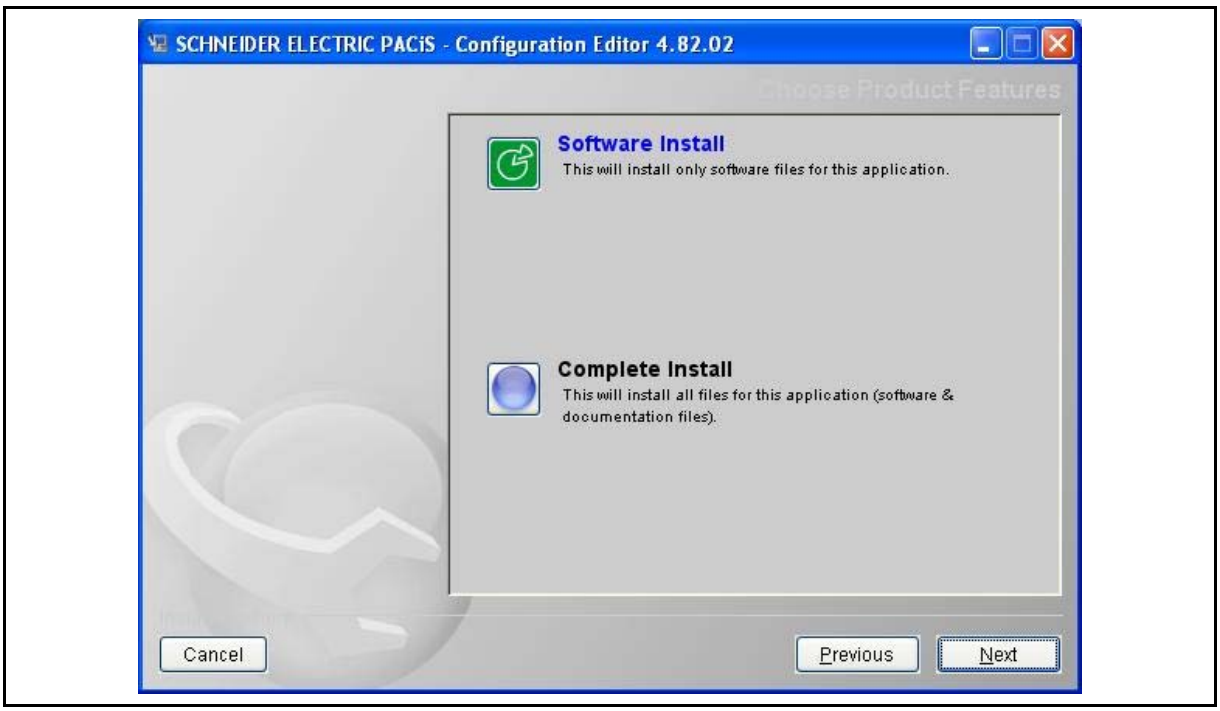

SCHNEIDER ELECTRIC PACiS - Configuration Editor 4.82.02
Choose Product Features
Software Install
This will install only software files for this application.
Complete Install
This will install all files for this application (software & documentation files).
Cancel
Previous
Next

FIGURE 6 - SELECTION OF INSTALLATION LEVEL

The window below is displayed to summarise the installation parameters before the real installation: install folder, shortcut folder, JRE installation folder (no choice for user) and disk space requirement.

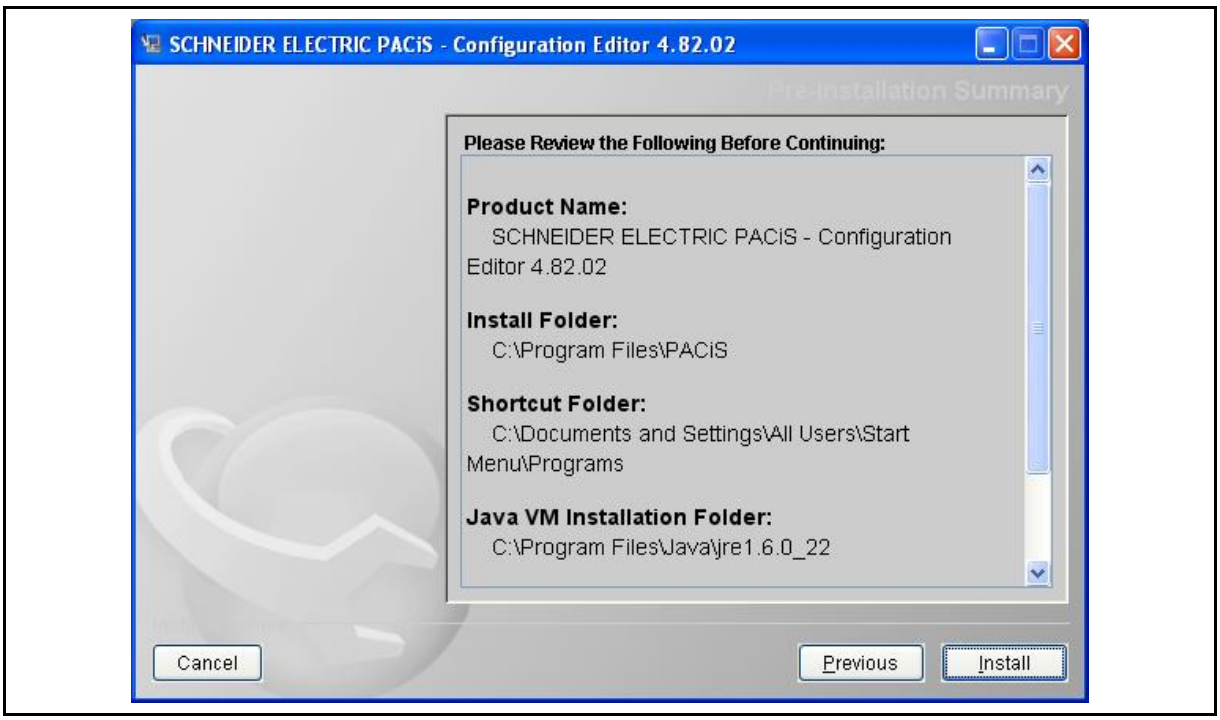


FIGURE 7 - PACiS SCE PRE-INSTALLATION SUMMARY

At this stage, all parameters are entered. It remains possible to stop the installation via the cancel button. The Install button will then start to uncompress in the defined folder.

FIGURE 8 - PACiS SCE INSTALLATION

After a few minutes it is proposed to end the installation clicking on a “Done” button.

FIGURE 9 - PACiS SCE INSTALLATION DONE

3.1.3 Check installation

During installation, Java heap max size is **automatically** set with 2/3 of ram size, max 1.3 GB.

CARE PRIOR STARTING to read and parameter correctly the equipment as described in chapter PACiS SCE SETTING.

3.1.4 PACiS SCE Tool Install: vcredist_X86.exe

Always execute/Install the vcredist_X86.exe file located in ("C:\Program files\PACiS\sce\<SCEVersion>\data\cal\setting\vcredist_x86\vcredist_x86.exe") .If it is not correctly installed, the setbuilder program to produce the setting files of MiCOM C264 may not work.

3.2 PACiS SCE Tool Install: PACiS OI XML Parser

If the host PC is used for generating PACiS OI databases, PACiS OI XML Parser is needed.

To proceed, starts by click on:

⇒ \\ <OIVersion> \PROGRAMS\XML Parser\Setup.exe

InstallShield wizard welcome screen appears with its license agreement and installation options. The standard is “Modify” and “Complete” options.

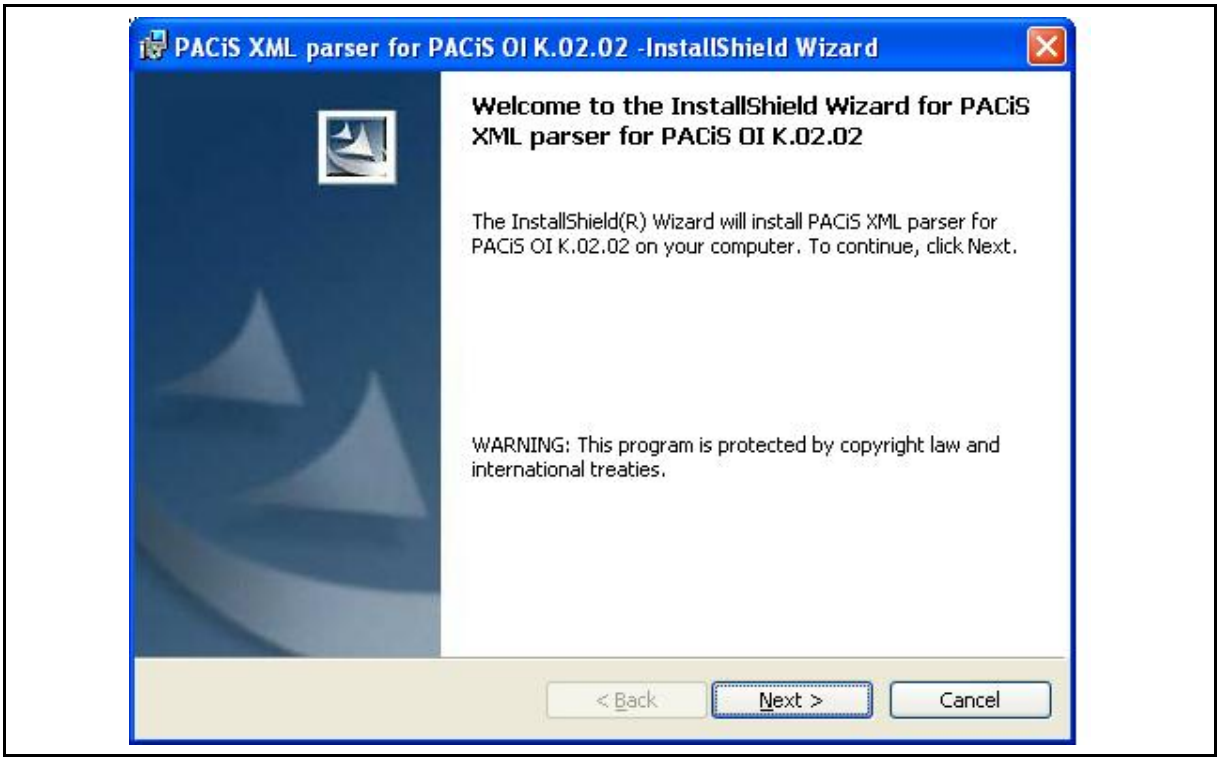

PACiS XML parser for PACiS OI K.02.02 -InstallShield Wizard
Welcome to the InstallShield Wizard for PACiS XML parser for PACiS OI K.02.02
The InstallShield(R) Wizard will install PACiS XML parser for PACiS OI K.02.02 on your computer. To continue, click Next.
WARNING: This program is protected by copyright law and international treaties.
< Back
Next >
Cancel

FIGURE 10 - PACiS OI XML PARSER INSTALLSHIELD, FIRST SCREEN

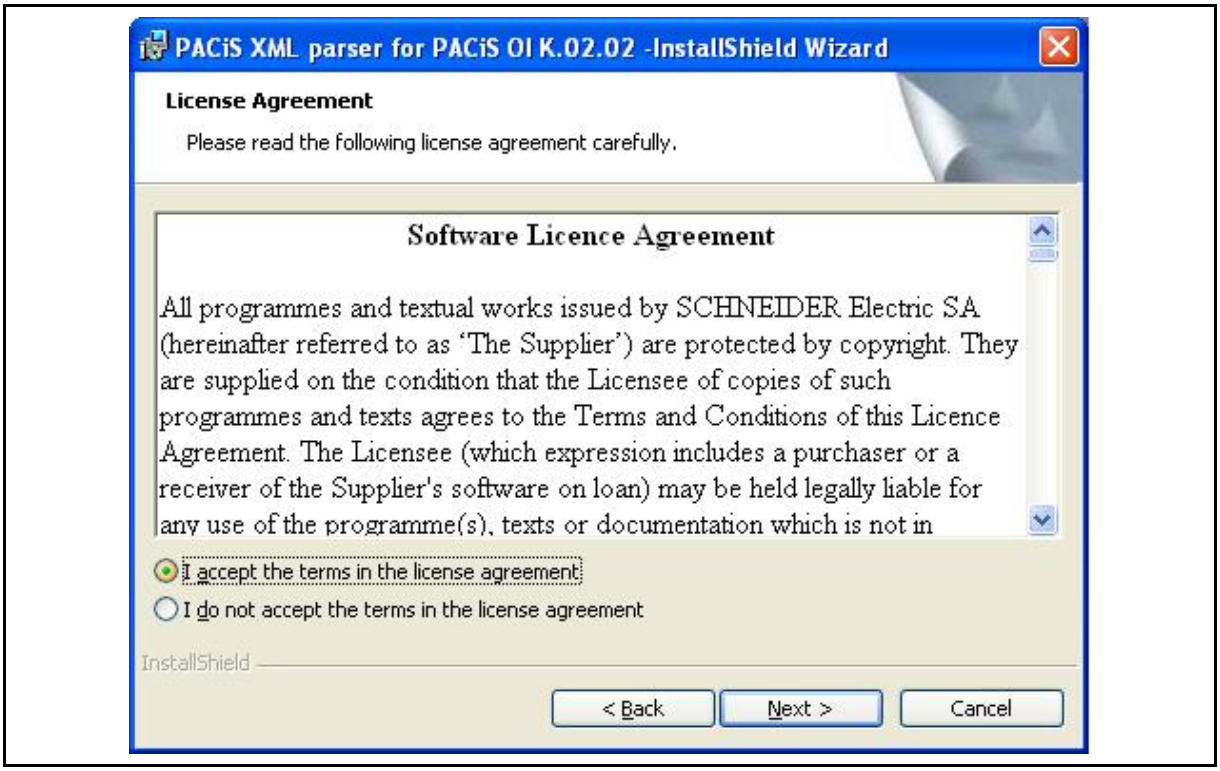

PACiS XML parser for PACiS OI K.02.02 -InstallShield Wizard
License Agreement
Please read the following license agreement carefully.
Software Licence Agreement
All programmes and textual works issued by SCHNEIDER Electric SA (hereinafter referred to as 'The Supplier') are protected by copyright. They are supplied on the condition that the Licensee of copies of such programmes and texts agrees to the Terms and Conditions of this Licence Agreement. The Licensee (which expression includes a purchaser or a receiver of the Supplier's software on loan) may be held legally liable for any use of the programme(s), texts or documentation which is not in
I accept the terms in the license agreement
I do not accept the terms in the license agreement
InstallShield
< Back
Next >
Cancel

FIGURE 11 - PACiS OI XML PARSER INSTALLSHIELD, SECOND SCREEN

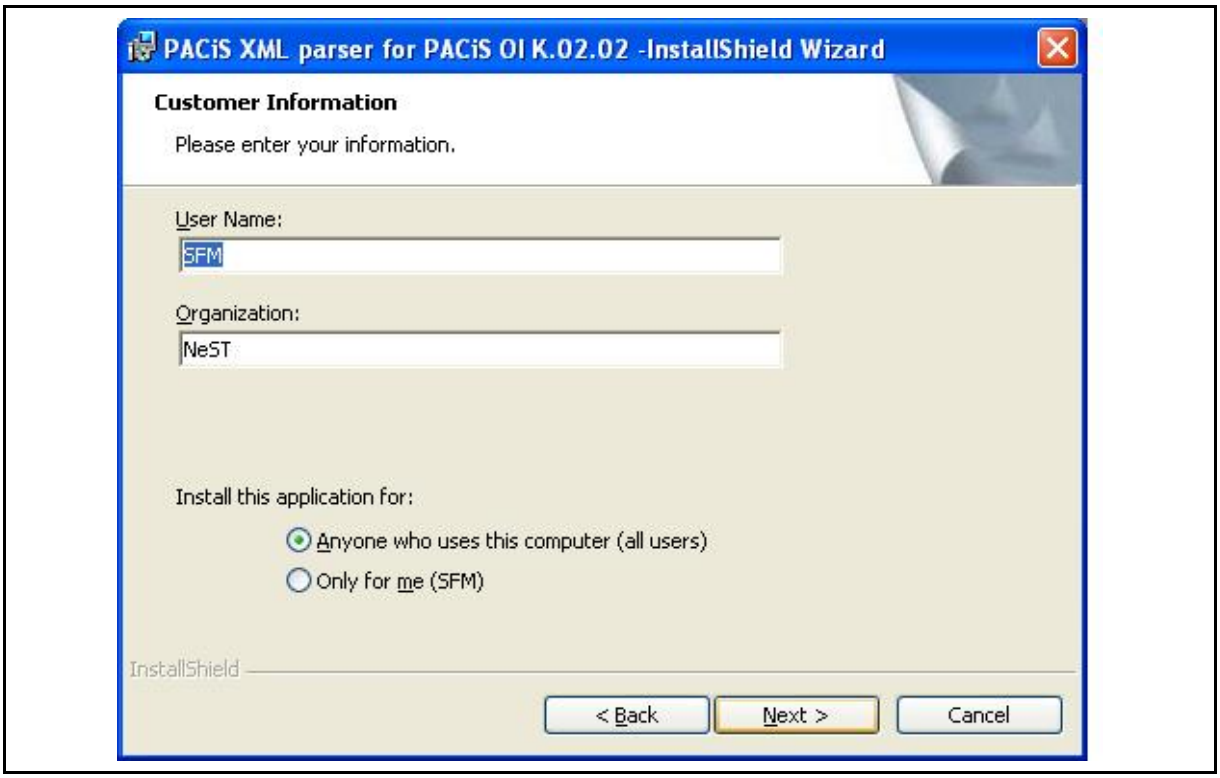


FIGURE 12 - PACiS OI XML PARSER INSTALLSHIELD, THIRD SCREEN

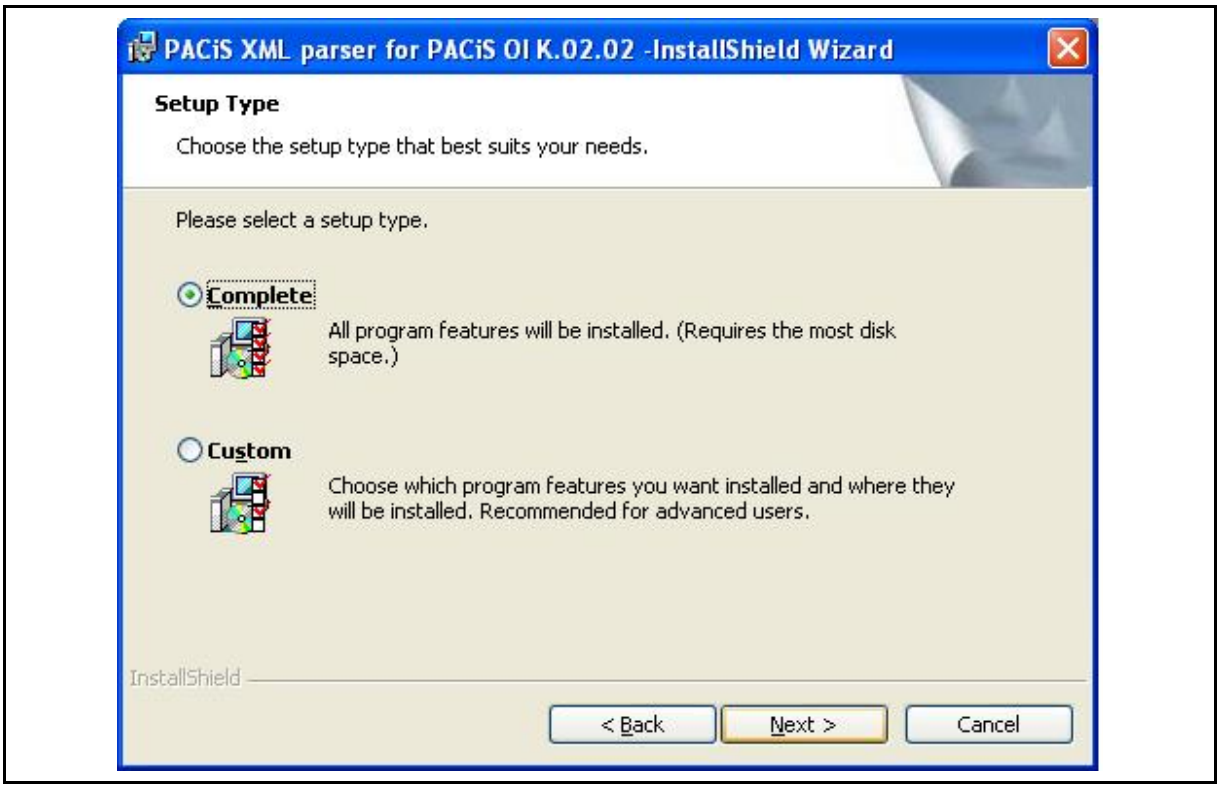

PACiS XML parser for PACiS OI K.02.02 -InstallShield Wizard
Setup Type
Choose the setup type that best suits your needs.
Please select a setup type.
Complete
All program features will be installed. (Requires the most disk space.)
Custom
Choose which program features you want installed and where they will be installed. Recommended for advanced users.
InstallShield
< Back
Next >
Cancel

FIGURE 13 - PACiS OI XML PARSER INSTALLSHIELD, FOURTHS SCREEN

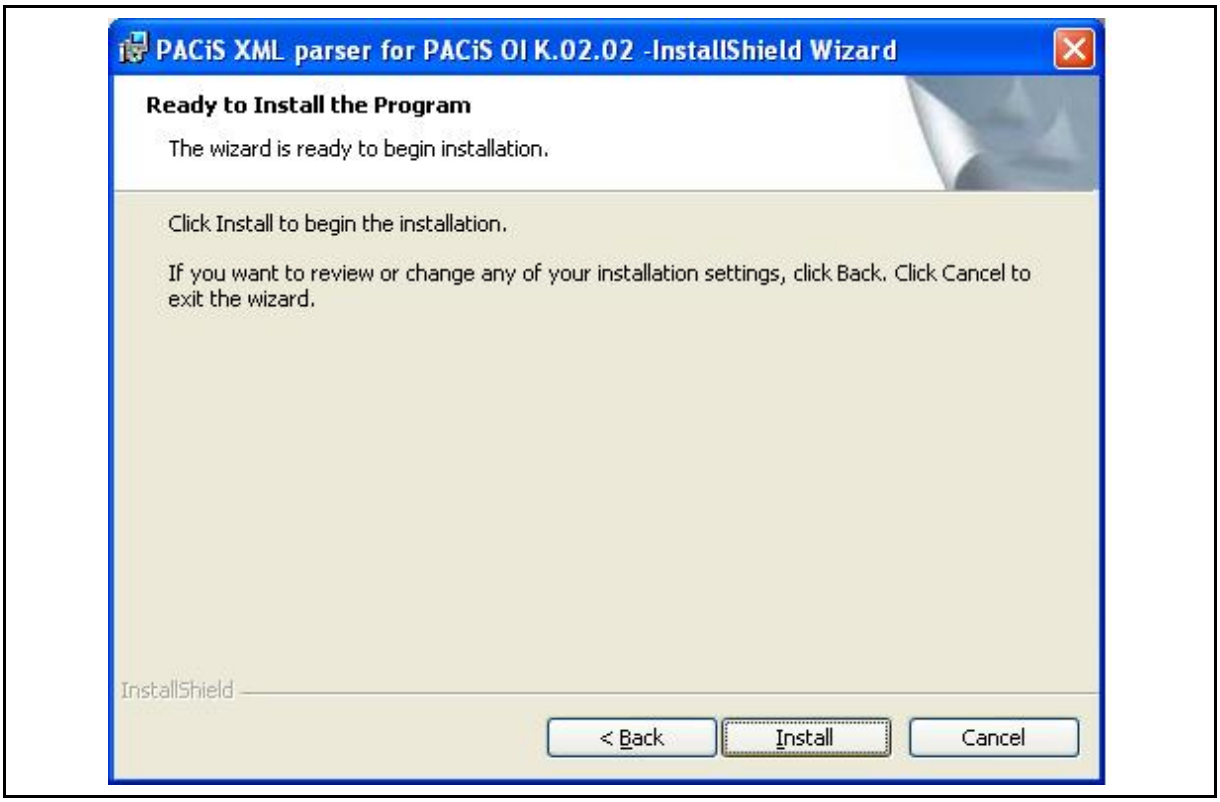

PACiS XML parser for PACiS OI K.02.02 -InstallShield Wizard
Ready to Install the Program
The wizard is ready to begin installation.
Click Install to begin the installation.
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.
InstallShield
< Back
Install
Cancel

FIGURE 14 - PACiS OI XML PARSER INSTALL

After this InstallShield installation the following screen is displayed.

It is then time to Install PACiS OI XML Parser clicking on install button for a few minute of file uncompress. The PACiS OI XML Parser is then in directory

⇒ D:\S2K_HMI\XSL

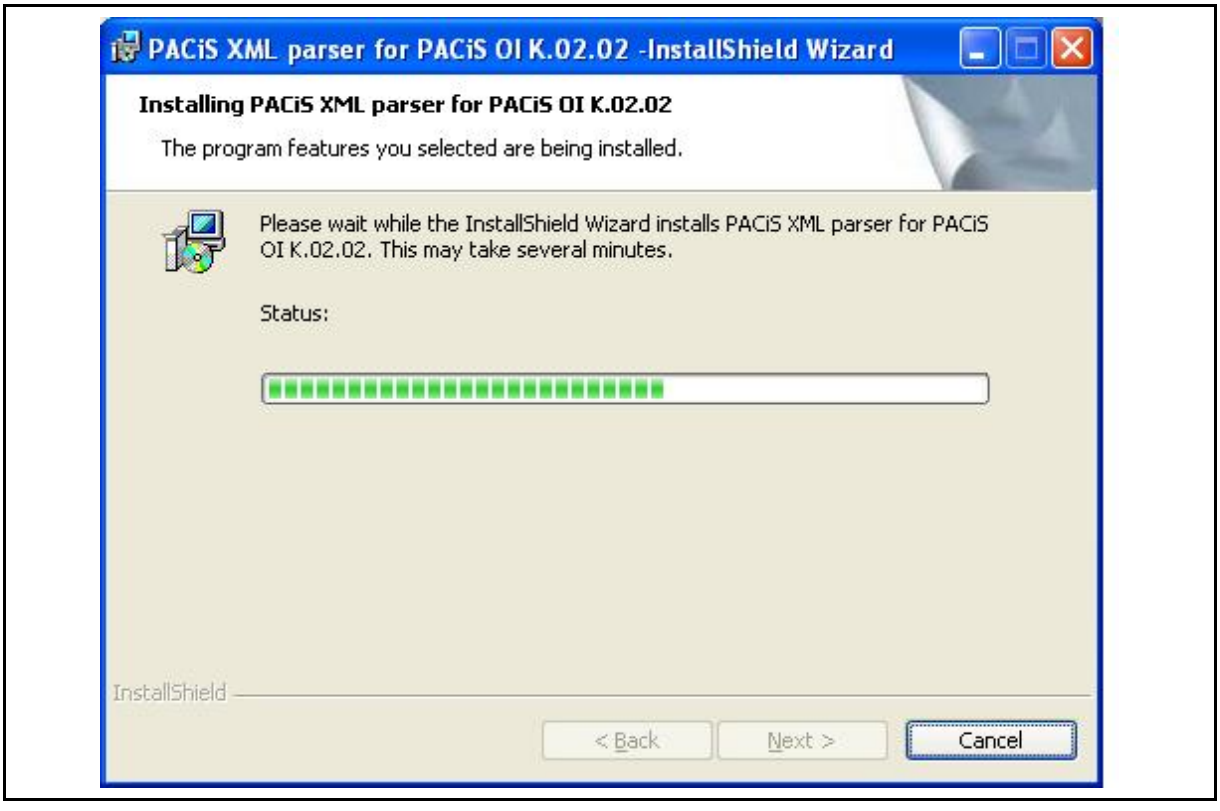

PACiS XML parser for PACiS OI K.02.02 -InstallShield Wizard
Installing PACiS XML parser for PACiS OI K.02.02
The program features you selected are being installed.
Please wait while the InstallShield Wizard installs PACiS XML parser for PACiS OI K.02.02. This may take several minutes.
Status:
InstallShield
< Back
Next >
Cancel

FIGURE 15 - PACiS OI XML PARSER, PLEASE WAIT

PACiS XML parser for PACiS OI K.02.02 -InstallShield Wizard
InstallShield Wizard Completed
The InstallShield Wizard has successfully installed PACiS XML parser for PACiS OI K.02.02. Click Finish to exit the wizard.
< Back
Finish
Cancel

FIGURE 16 - PACiS OI XML PARSER, INSTALLATION COMPLETE

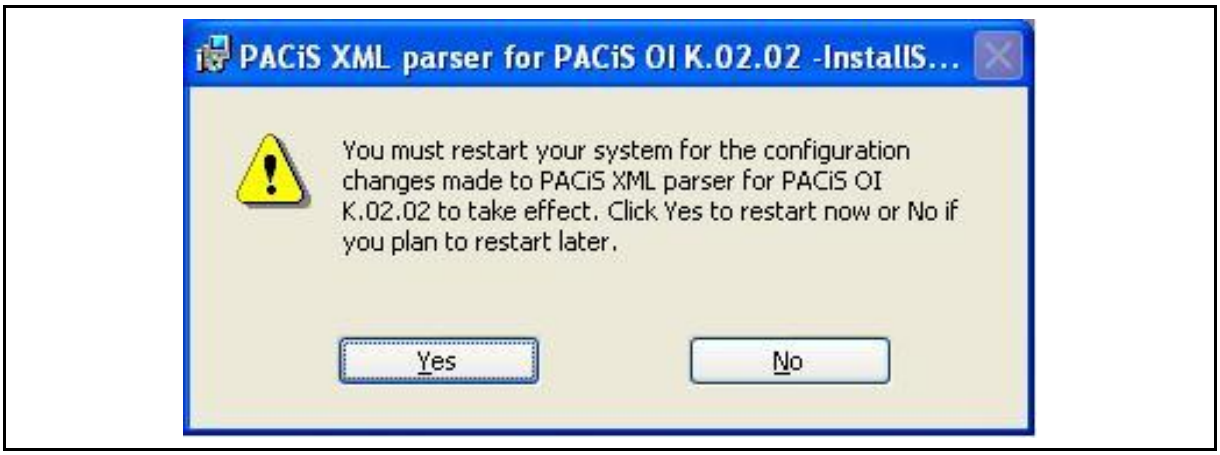

PACiS XML parser for PACiS OI K.02.02 -InstallS...
You must restart your system for the configuration changes made to PACiS XML parser for PACiS OI K.02.02 to take effect. Click Yes to restart now or No if you plan to restart later.
Yes
No

FIGURE 17 - RESTART

Restart your computer for a correct running of XML Parser.

3.3 PACiS SCE Tool Install: Configurable Automation ISaGRAF

ISaGRAF PRO is a tool for the definition of automation. This software has a license. Refer to its installation manual and its separate CD-ROM.

Start on CD-ROM: \\Setup.exe

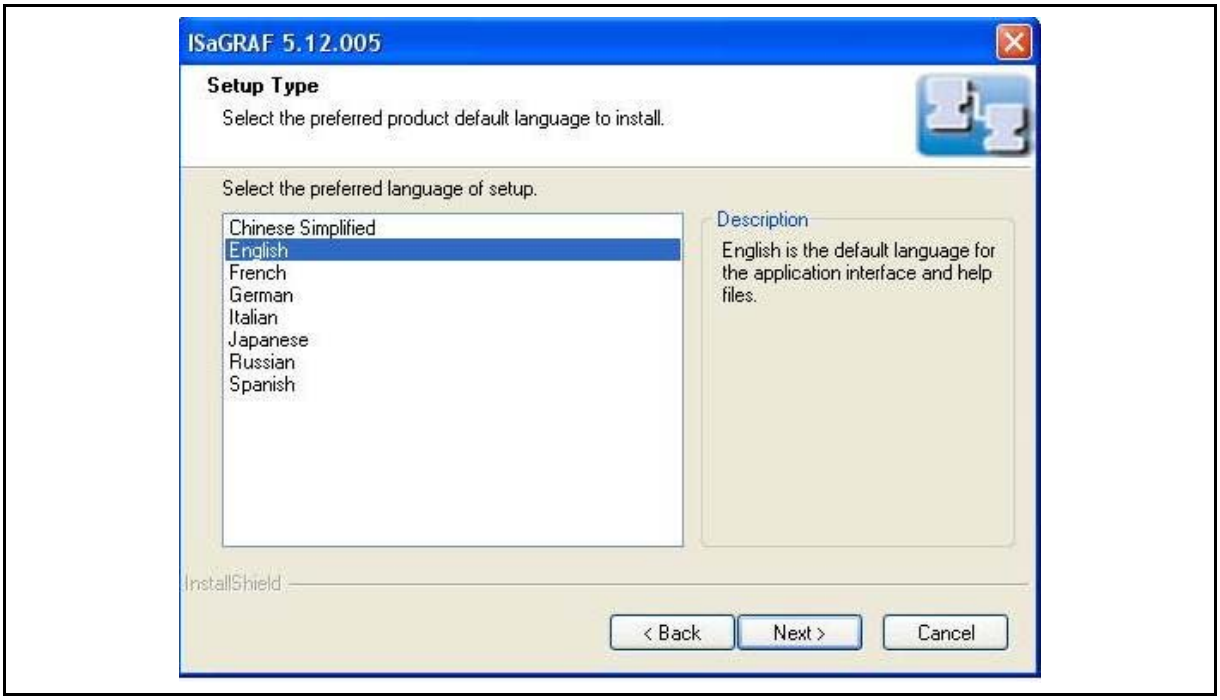


FIGURE 18 - INSTALL ISaGRAF SELECT LANGUAGE

Select your Language version (for install and help files) than your installation directory when you have checked licence rights.

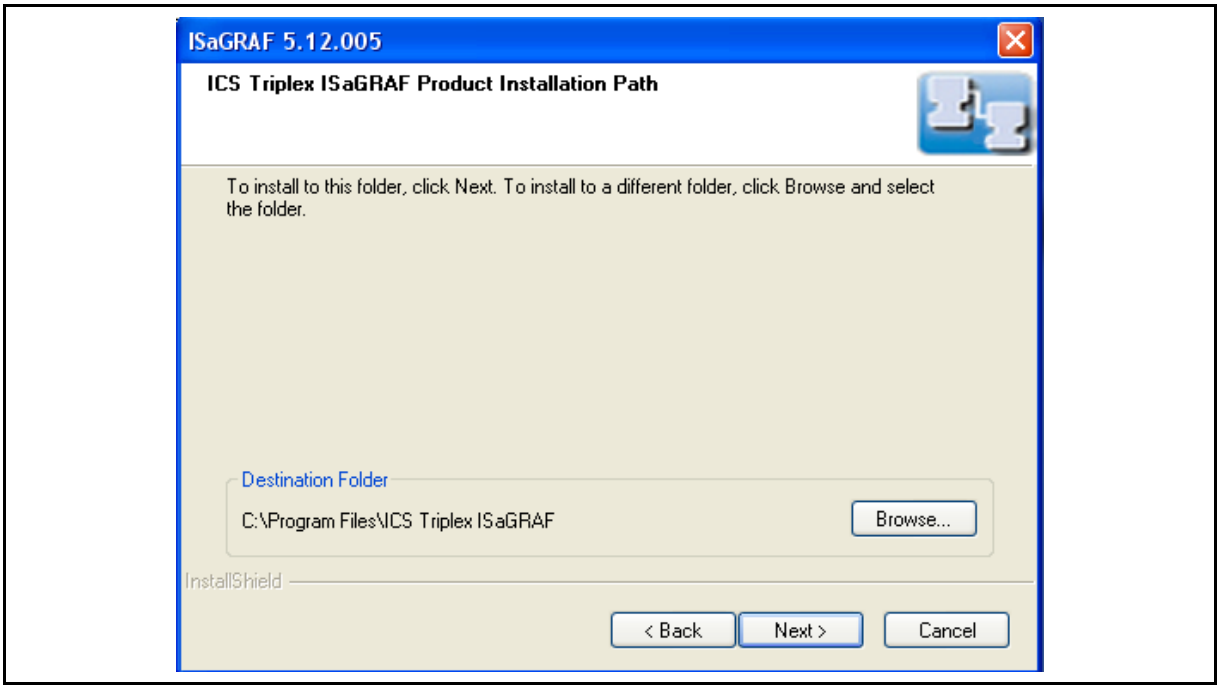

ISaGRAF 5.12.005
ICS Triplex ISaGRAF Product Installation Path
To install to this folder, click Next. To install to a different folder, click Browse and select the folder.
Destination Folder
C:\Program Files\ICS Triplex ISaGRAF
Browse...
InstallShield
< Back
Next >
Cancel

FIGURE 19 - INSTALL ISaGRAF SELECT IDIRECTORY

Select a full installation, and accept to reboot the PC.

It may be more appropriate to install it into SCE directory (with other tool).

Set the ISaGRAF path in the menu Tools > Options...

3.4 PACiS SCE Tool Install: Configurable Automation ISaGRAF data access

To compile ISaGRAF project from PACiS SCE and if Microsoft Access 97 is not installed, you need MS Office 97 ValuPack.

Install the ODBC driver (dataacc.exe) provided in the MS Office 97 Value Pack. You can download the MS Office 97 Value Pack from:

- http://www.microsoft.com/ and search for these key words “Office 97 ValuPack”. Make sure that you spell ValuPack the Microsoft way: it is a registered trademark name.
- http://www.microsoft.com/downloads/en/details.aspx?familyid=BEFD7842-602E-42B0-89D2-6BE39F1167C1&displaylang=en

Office 97 SR-2b is a free update to Office 97, consisting of a series of recent fixes and designed to make it even easier for customers to deploy Office 97. SR-2b includes currently available downloads such as the Microsoft Excel 97 for Windows Auto-Recalculation Patch.

3.5 ISaGRAF upgrade

If you have a dongle for ISaGRAF 5.13, you can upgrade it to 5.21.

To do this, install license manager. Then, insert the dongle for 5.13 and launch license manager. Do this procedure for each dongle, one at a time.

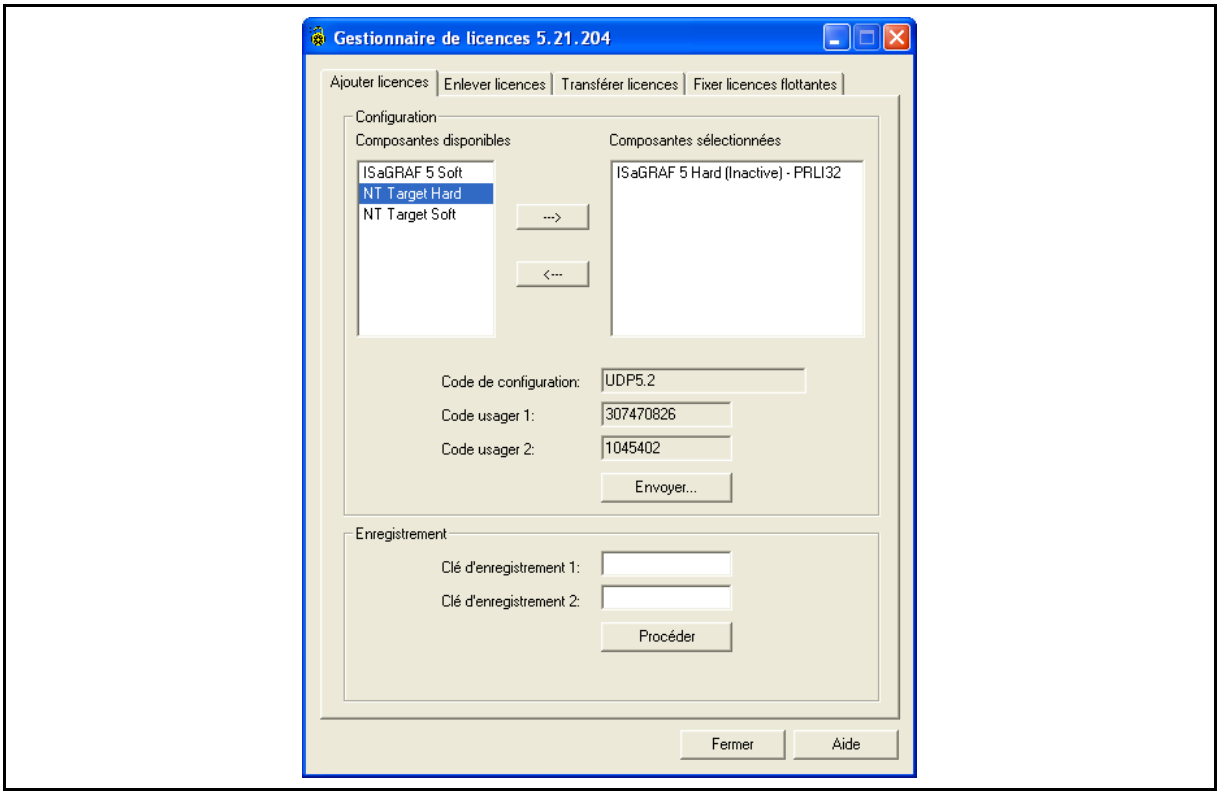
- Download and install the dongle management software Sentinel Protection on the ISaGRAF USB dongle. This dongle software is available at:

  http://c3.safenet-inc.com/downloads/0/F/0FE57DCB-3A4A-4197-9728-EDF352C04562/Sentinel%20Protection%20Installer%207.2.2.exe

- Install the License Manager application.
- Insert the dongle for 5.13
- Start the License Manager application.
- The License Manager window shows that the dongle is for ISaGRAF 5.1X:

License Manager
La clé électronique est présentement licencé pour ISaGRAF PRO 5.1X.
Vous devez vous procurer une mise à jour de votre licence ISaGRAF PRO 5.2X auprès de votre distributeur.
OK

– Click OK. The License Manager window shows:



– To claim your upgrade from ISaGRAF Version 5.13 to ISaGRAF Version 5.21, click Send... The License Manager sends the User codes 1 and 2 to ISaGRAF support:

supporteurope@isagraf.com

– ISaGRAF sends you the Registry keys 1 and 2.

– Type the Registry keys 1 and 2 in the License Manager. Click Proceed.

– The Upgrade of the dongle is complete. Remove the dongle.

NOTE: The User codes are not regenerated if you change your dongle before upgrade it.

3.6 PACiS SCE Tool Install: Acrobat Reader

Acrobat Reader 5.0 or higher is required to display documentation.

3.7 PACiS SCE Tool Install: msxml.dll

Check the msxml.dll file dates in WINDOWS/system32 folder: if they are different from those provided in Tools / msxml_dlls.zip file (on PACiS CD), replace them and do not install any third-party applications after.

3.8 PACiS SCE Data Bases Libraries Installation

There is no real installation of PACiS SCE databases. Databases are files (with extension mpc or mpl). Any file copy can be used. They are open in run time from PACiS SCE.

3.9 PACIS SCE Tool Install: SCE.lax

To force clean & save during a configuration upgrade, add in SCE.lax:

Dsce.CleanOnUpgrade="true"

To disable the merge of ISaGRAF functions when a PLC contains only one function, add this line to the file SCE.lax:

Dsce.NoPLCMergeForOneFunction="true"

4. PACiS SCE UNINSTALL

For all uninstall it is possible to use Windows tools with

“Start-up/Settings/Control panel/Add Remove Programs “ and the selection of:

- PACiS System Configuration Editor
- PACiS XML Parser for HMI
- ISAGRAF PRO
- …

In the case of PACiS SCE, the Uninstall can be done directly with “Start-up/Application menu” on item uninstall.

5. PACiS SCE DATA BASE UPGRADE

In Product life, new version of PACiS SCE may be delivered, with new features, and corrections. Delivery form or release note should be read carefully because it explains optional upgrade procedures.

A new PACiS SCE version is installed as explain before. Difference is that during installation, the software is copied under a new directory with the new PACiS SCE version.

A Database upgrade between two consecutive versions of PACiS SCE is most of the time made only by starting new PACiS SCE version, and loading the old database. A message upgrade is displayed. If user saves, the saved database is upgraded to the new PACiS SCE version.

Between major evolution of the PACiS SCE (first version number is incremented) the structural database could change. In this case, a special note is added into release note. The upgrade of the database is then made in 2 main steps.

1. Export DB from old PACiS SCE version

   ⇒ Launch old PACiS SCE version

   ⇒ Open the DB to upgrade

   ⇒ Menu File/ Prepare Upgrade & Save (save DB with additional data)

   ⇒ Close this PACiS SCE version

2. Import DB into new PACiS SCE version

   ⇒ Launch new PACiS SCE version

   ⇒ Open the DB

   ⇒ Save DB changing its name and directory

A good practice is to store DB from a special PACiS SCE version, in a separate directory that include PACiS SCE DB version and to name DB with PACiS SCE version included. Anyway other chapters explain automatic controls made on DB.

6. INSTALLATION OF GROOVY ENVIRONMENT

1. Install the JAVA JRE version as per SCE Release Note **(**Download the expected JAVA JRE version at http://java.com/). It's normally made by the set-up of SCE.

2. In the Windows Configuration Panel of the SCE machine using the JAVA console check the system and user JAVA JRE version

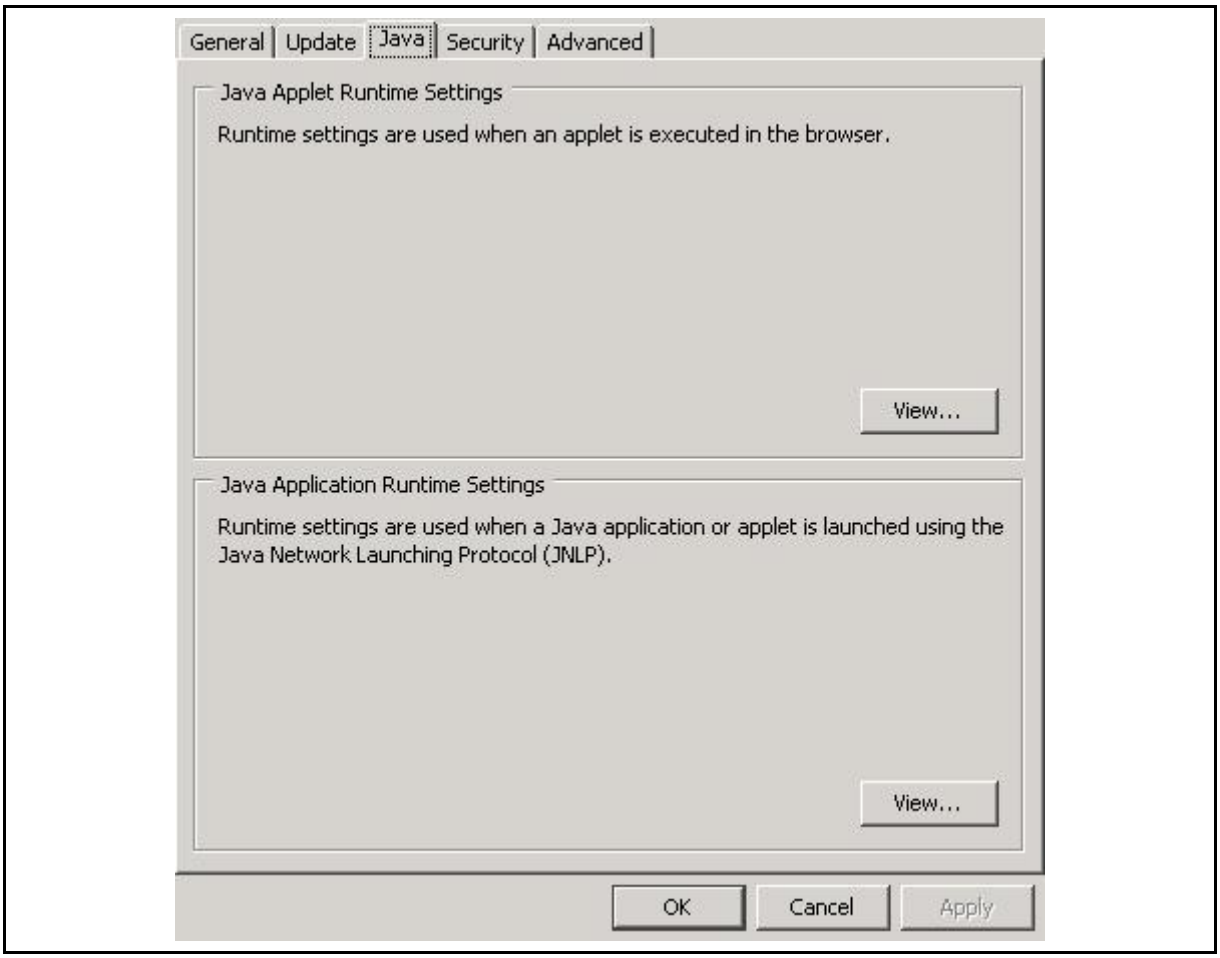


FIGURE 20 - JAVA CONSOLE IN THE WINDOWS CONFIGURATION PANEL, JAVA TAB

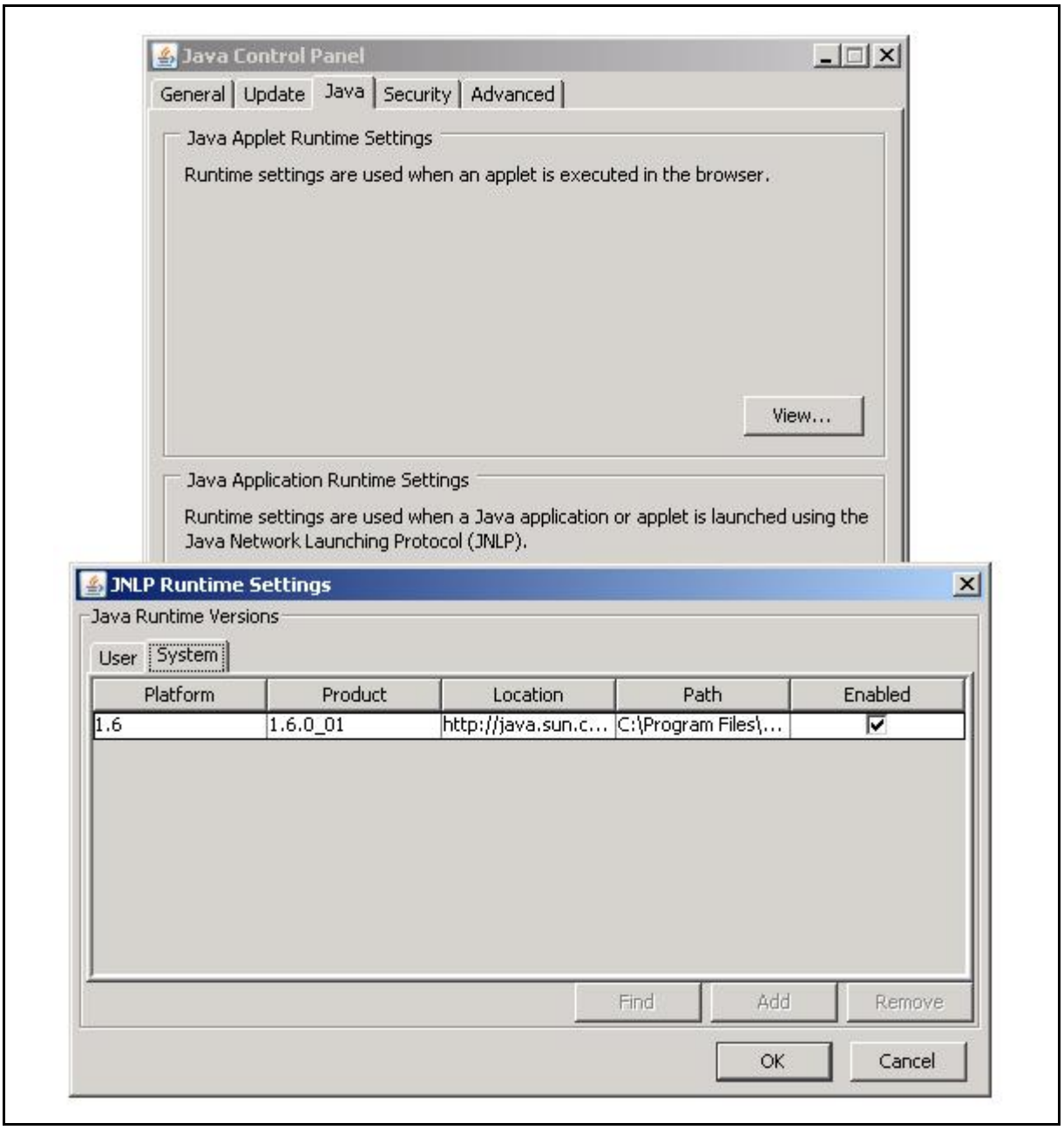


FIGURE 21 - JAVA CONSOLE IN THE WINDOWS CONFIGURATION PANEL, ACTIVATED SYSTEM JAVA APPLICATION RUNTIME VERSION (S)

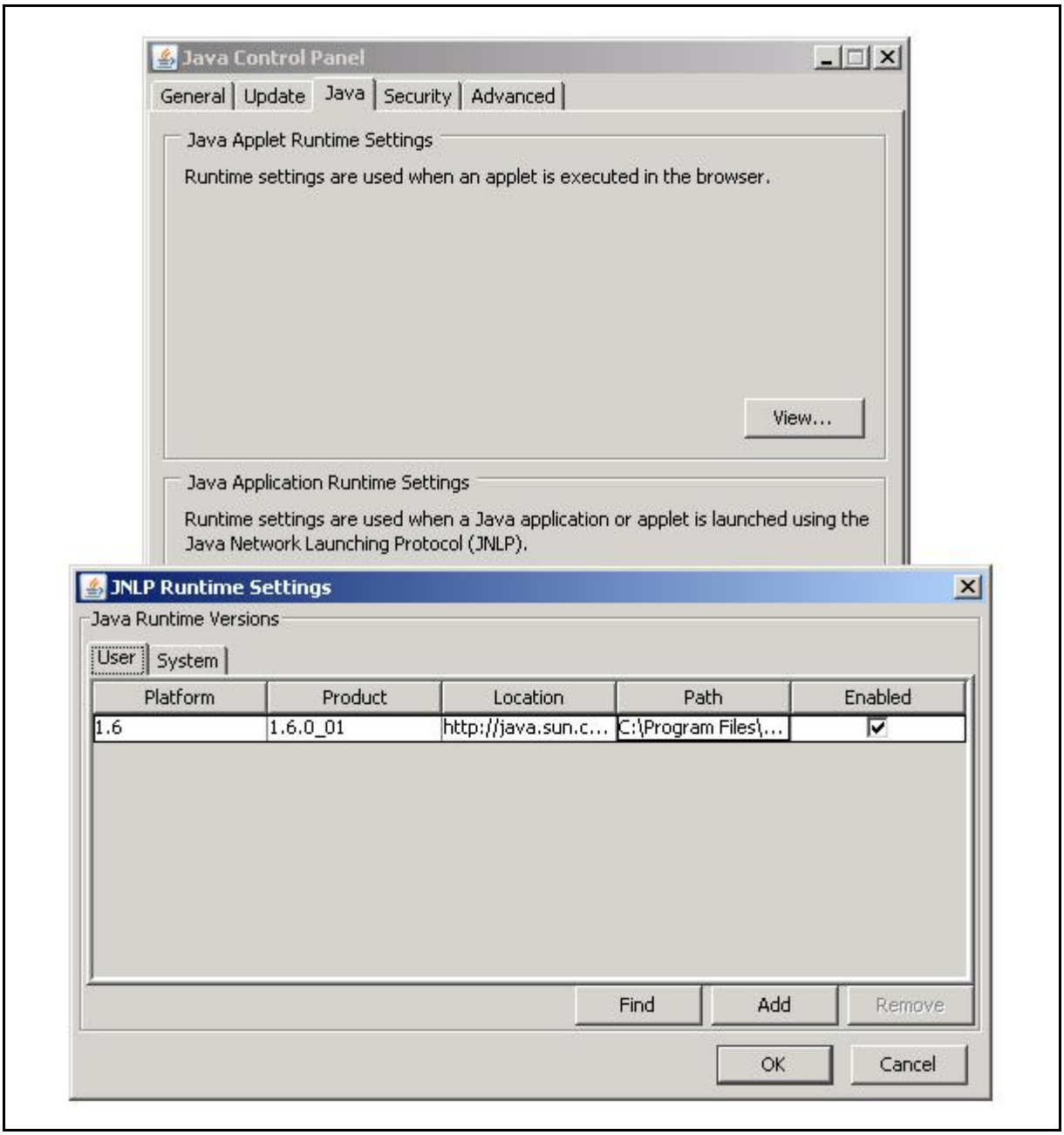


FIGURE 22 - JAVA CONSOLE IN THE WINDOWS CONFIGURATION PANEL, ACTIVATED USER JAVA APPLICATION RUNTIME VERSION (S)

3. In the Windows Configuration Panel using the JAVA console configure JAVA Updates to never check for updates automatically

Java Control Panel
General
Update
Java
Security
Advanced
Update Notification
The Java Update mechanism ensures you have the most updated version of the Java platform. The options below let you control how updates are obtained and applied.
Notify Me:
Before downloading
Check for Updates Automatically
Advanced...
Every Sunday at 12:00 AM, Java Update will check for updates. An
Java Update - Warning
You have chosen to never check for updates and may miss future security updates.
We strongly recommend letting Java periodically check for newer versions to ensure you have the most secure and fastest Java experience.
Check Weekly
Never Check
Update Now
OK
Cancel
Apply

FIGURE 23 - JAVA CONSOLE IN THE WINDOWS CONFIGURATION PANEL, NEVER CHECK FOR UPDATES AUTOMATICALLY

4. Download the Windows Installer Groovy 1.6 Release at url: htttp://groovy.codehaus.org/Download
5. Run the groovy-1.6.0-installer.exe and follow wizard
6. Run the batch file {PACIS_SCE_DIRECTORY}\ScriptsManager\launchGroovy.bat
7. Groovy Console appears

7. TEST

The test strategy consists in creating various scripts dedicated to the various silent mode commands. Targeted data bases will be standard ones (no import), PCCN ones (XML files import) and PACIS “d” ones (FCS files import) when available.

Run the script using the command line.

SETTINGS

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1. SCOPE OF THE DOCUMENT

This document is a chapter of PACiS System Configuration Editor PACiS SCE V4.8 documentation. It describes the Settings -or on-line- parameters, which can be modified in runtime PACiS SCE or during the installation time.

2. PACiS SCE SETTING

For a better efficiency of the installation part, optimal settings need to be done on:

- PACiS SCE configuration file lax
- PACiS SCE run-time setting

2.1 Setting PC memory

To optimize management of PC RAM, it is necessary to adjust Java heap size.

During installation, Java heap max size is **automatically** set with 2/3 of ram size, max 1.3 GB.

After installation, Java heap max size could be updated manually: modify the parameter `lax.nl.java.option.java.heap.size.max` (bytes) in file sce.lax. This parameter must not exceed 1.3 GB. File sce.lax is in the installation directory.

After ram size updating (add or remove ram), run script UpdateLaxFile.vbs in install directory: this script updates Java heap min size with 32 MB and max size with 2/3 of new ram size, max 1.3 GB..

NOTE: Some PC BIOS does not allow to assign more than 1,25 GB to a single application. Check with your PC technical document before setting the PC memory in the sce.lax.

2.2 PACiS SCE Online Path Setting

After its installation, PACiS SCE needs its external tools paths. This is done with PACiS SCE, on line.

Start it via “Start Menu” application launcher:

`Programs/PACiS/Configuration Editor x.y/SC`

Into PACiS SCE window select in menu bar the “Tools/Options…” item.

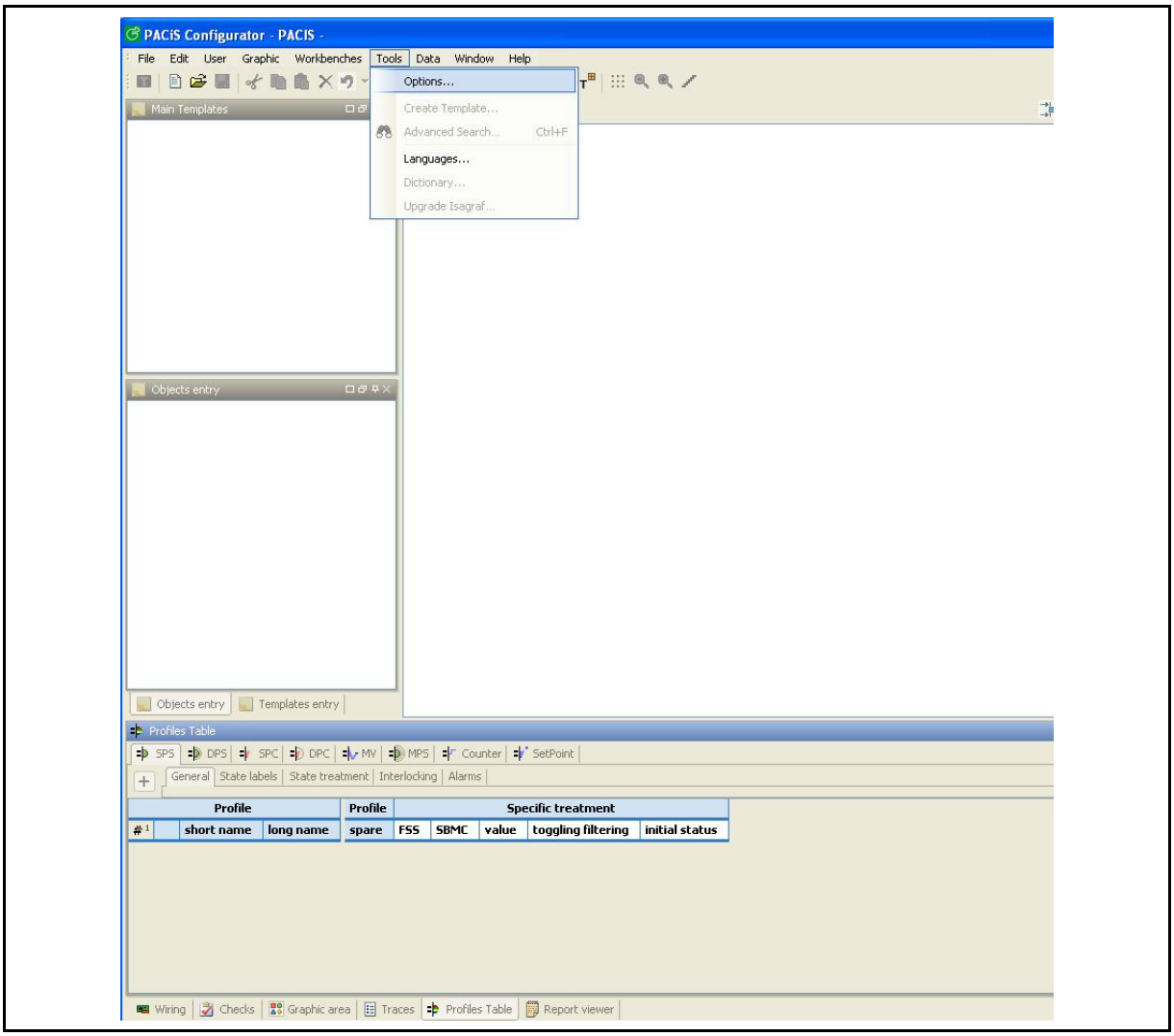

FIGURE 1 - PACiS SCE SETTING AFTER INSTALL

A window “Setting Manager” opens with all PACiS SCE settings.

The optionally installed tool paths have to be entered. Their values must be updating according to their installation folders. It is especially the case for:

- ISaGRAF Workbench path setting: the installation folder of ISaGRAF tool.
- Acrobat Reader Application path: the binary file path of Acrobat Reader.

The other settings do not depend of other tools or others installations:

- General part settings: the properties of PACiS SCE (read only).
- Status bar part settings: the displaying options of status bar.
- Graphic part settings: the graphical editors (mimic editor, bay mimic editor,…) options.
- Access part settings: default working paths.
- Miscellaneous part setting: device generation options or general edition options.

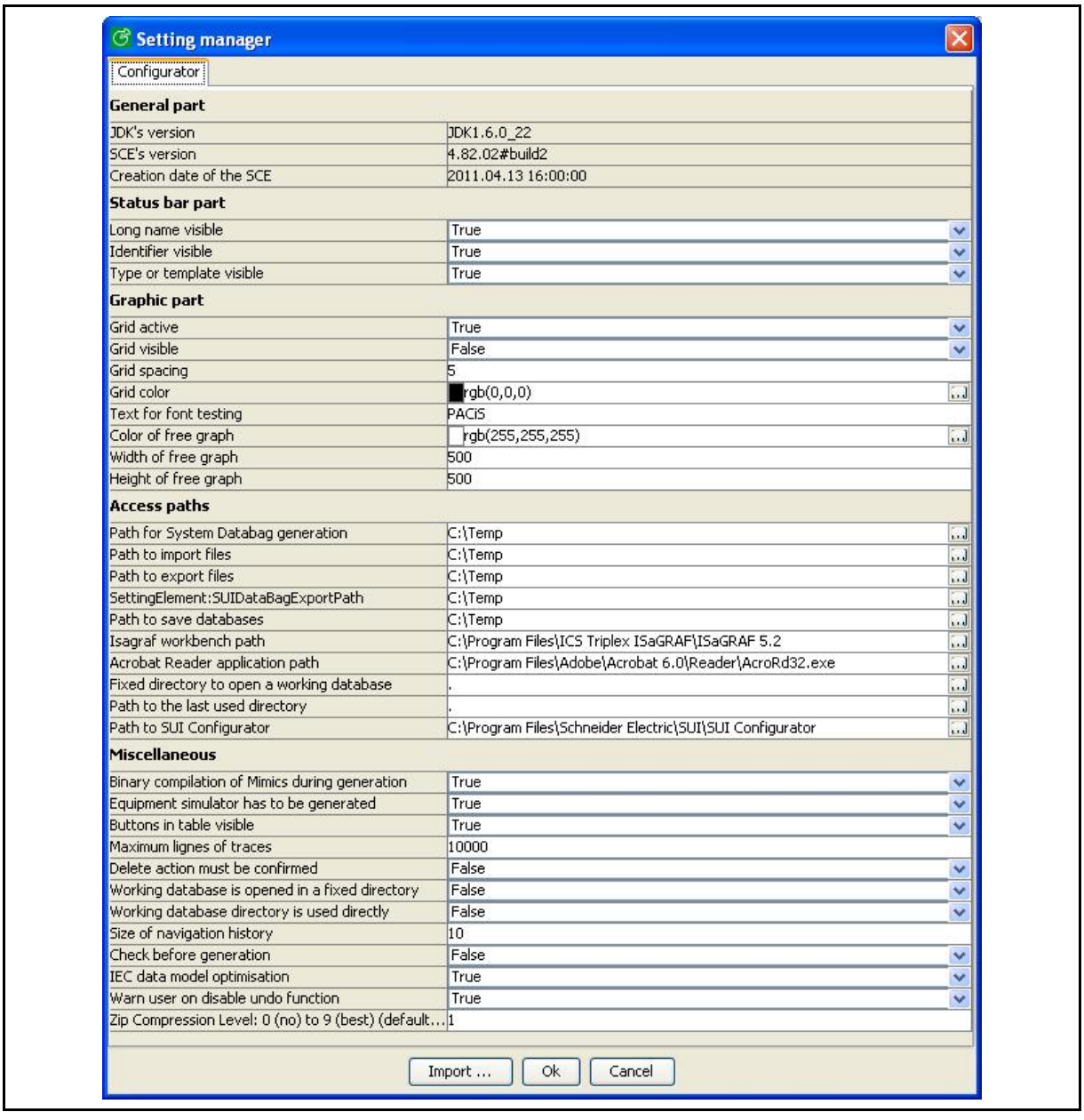

FIGURE 2 - PACiS SCE SETTING MANAGER

Path name can be entered directly, or selection of associate button starts an explorer to choose directory.

2.3 PACiS SCE settings import

A settings set can be imported from a previous version of PAciS SCE. This operation avoids modifying default settings after each PACiS SCE installation.

This feature is available through the **Import** button of PACiS SCE Setting Manager dialog box.

The folllowing **Select** dialog box is then displayed. A settings file of a previous PACiS SCE version must be chosen.

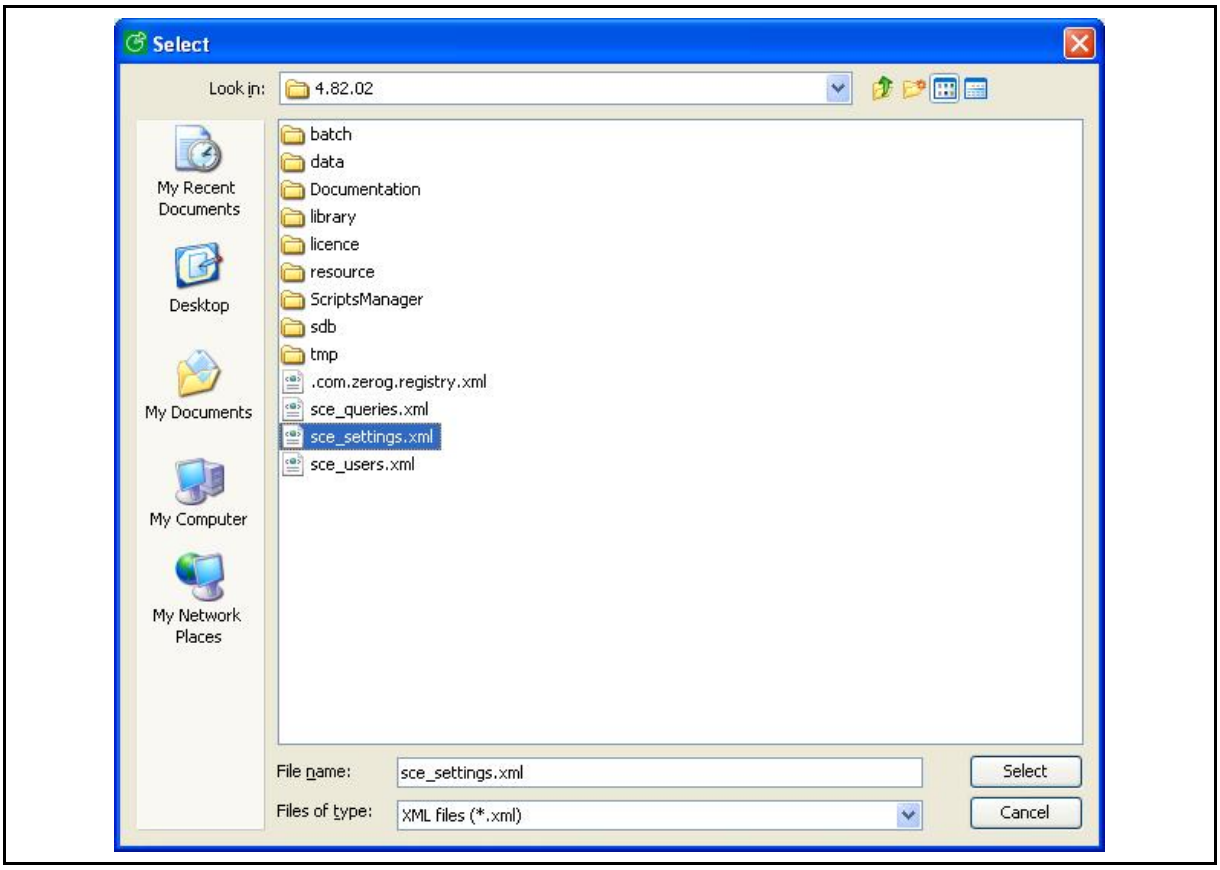

FIGURE 3 - PACiS SCE SETTING IMPORT

After its selection, the settings of the opened PACiS SCE are updated with theses settings.

3. REGITRY KEYS

The PACiS SCE application records a registration key:

HKEY_LOCAL_MACHINE\SOFTWARE\...\PACIS\System Configuration Editor\4.8

NOTE: For the complete path access of registry key, please consult the Schneider Electric technical support if needed.

which has the following strings value:

Name	Type	Data	Usage
InstallDir	REG_Z	C:\Program Files\PACiS	Where to find the SCE executable

This key is issued by the installation procedure of a patch to erase files of an already installed version.

RECORD SHEET

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1. SCOPE OF THE DOCUMENT

This document is a chapter of PACiS System Configuration Editor PACiS SCE V4.8 documentation. It describes the Commissioning record sheet and the Setting Record (RS) of this PACiS SCE.

2. WORKSTATION CHARACTERISTICS

2.1 PC Characteristics

PC Name	
Clock Frequency (GHz)	
RAM Size (MB)	
DD Size (MB)	

2.2 OS Characteristics

WINDOWS XP SERVICE PACK	

3. INSTALLATION

3.1 Software Delivery

PACiS SYSTEM VERSION	

PACiS SYSTEM Release Note Checked:

☐ Yes

☐ No

PACiS SCE VERSION	

PACiS SCE Release Note Checked:

☐ Yes

☐ No

3.2 PACiS SCE Installation

3.2.1 General Installation

PACiS SCE Installed using PACiS SCE IN Manual:

☐ Yes

☐ No

PACiS SCE Installation directory:

☐ Standard (C:\Program Files\PACiS\SCE)

☐ Other (precise): _____

PACiS SCE Installation Choice:

☐ Complete (Software & Documentation)

☐ Documentation

☐ Software

PACiS SCE Installation problem:

☐ Yes

☐ No

3.2.2 Optional Installations

Crystal Report Installation

☐ Yes

☐ No

PACiS OI XML Parser Installation

☐ Yes

☐ No

PACiS OI XML Parser VERSION	

Automation ISaGRAF data access Installation (if MS access 97 is not installed)

☐ Yes

☐ No

ISaGRAF PRO Installation

☐ Yes

☐ No

ISaGRAF PRO VERSION	

3.3 Installation checking

3.3.1 General Checking

Check that the following files or directories are in the correct path (cf. PACiS SCE IN Manual):

☐ SCE version directory

☐ j2re (java directory)

☐ msxml.dll file dates in WINNT/system32 folder: they must be identical with those provided in Tools/ msxml_dlls.zip file (on PACiS CD)

☐ ISaGRAF (optional)

Check that the following items are in the Start Menu:

☐ PACiS SCE

☐ ISaGRAF PRO (optional)

3.3.2 Settings Checking

SCE.lax setting values: open SCE.lax file and report the following values:

lax.nl.java.option.java.heap.size.max	

PACiS SCE launched:

☐ Yes

☐ No

Check in PACiS SCE setting manager (Menu Tools, Options) the following values:

JDK’s version	
PACiS SCE’s version	

MAINTENANCE

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1. SCOPE OF THE DOCUMENT

This document is a chapter of PACiS System Configuration Editor PACiS SCE V4.8 documentation. It describes the Maintenance and Fault Finding procedures of the product. It is the chapter Maintenance (SCE/MF EN) of the PACiS SCE.

2. CHECKS

This section presents the list and the corresponding explanation of the error/warning messages you can get into the checks tab of the log window.

Theses errors or warning are raised during the complete consistency check of the current configuration. The check function is available via menu item file/check (shortcut F6).

Checks are performed according to the following steps:

- General checks
- System checks
- Electrical checks
- Graphical checks
- Datapoints checks

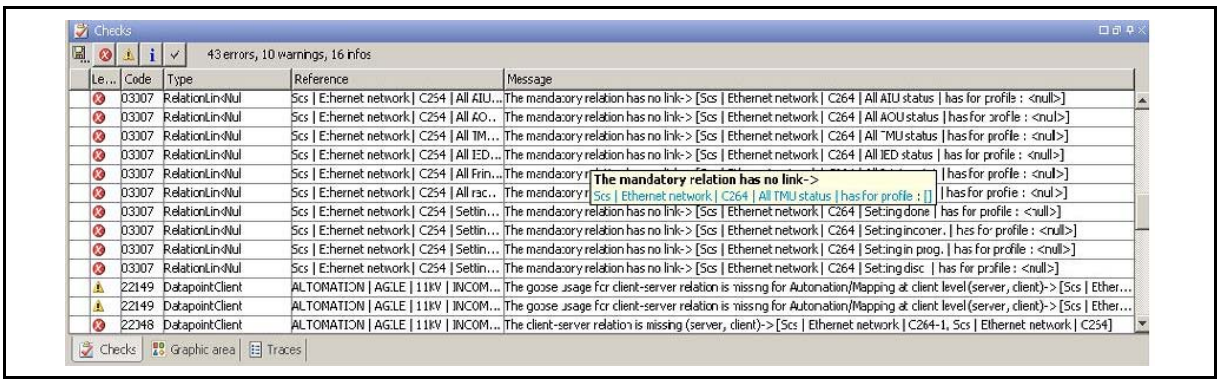
Spare objects are not processed.

Objects in Temporary area are not processed.

Referenced document is SCE Check Specification-DSL2-Issue B1.

2.1 Check user interface

The system displays check traces in the following table of the Traces panel ("Checks" tab):


Checks
43 errors, 10 warnings, 16 infos
Le...
Code
Type
Reference
Message
03307 RelationLinkNul Scs | E:hernet network | C254 | All AIU... The mandatory relation has no link-> [Scs | Ethernet network | C264 | All AIU status | has for profile : <null>]
03307 RelationLinkNul Scs | E:hernet network | C254 | All AO.. The mandatory relation has no link-> [Scs | Ethernet network | C264 | All AOU status | has for profile : <nul>]
03307 RelationLinkNul Scs | E:hernet network | C254 | All TM... The mandatory relation has no link-> [Scs | Ethernet network | C264 | All TMU status | has for profile : <nul>]
03307 RelationLinkNul Scs | E:hernet network | C254 | All IED... The mandatory relation has no link-> [Scs | Ethernet network | C264 | All IED status | has for profile : <null>]
03307 RelationLinkNul Scs | E:hernet network | C254 | All Frin... The mandatory r | has for profile : <null>]
03307 RelationLinkNul Scs | E:hernet network | C254 | All rac.. The mandatory r | has for profile : <nul>]
The mandatory relation has no link->
Scs | Ethernet network | C264 | All TMU status | has for profile : []
03307 RelationLinkNul Scs | E:hernet network | C254 | Setlin... The mandatory relation has no link-> [Scs | Ethernet network | C264 | Setting done | has for profile : <null>]
03307 RelationLinkNul Scs | E:hernet network | C254 | Setlin... The mandatory relation has no link-> [Scs | Ethernet network | C264 | Setting inconer. | has for profile : <null>]
03307 RelationLinkNul Scs | E:hernet network | C254 | Setlin... The mandatory relation has no link-> [Scs | Ethernet network | C264 | Setting in prog. | has for profile : <null>]
03307 RelationLinkNul Scs | E:hernet network | C254 | Setlin... The mandatory relation has no link-> [Scs | Ethernet network | C264 | Setting disc | has for profile : <null>]
22149 DatapointClient ALTOMATION | AGILE | 11kV | INCOM... The goose usage for client-server relation is missing for Automation/Mapping at client level (server, client)-> [Scs | Ether...
22149 DatapointClient ALTOMATION | AGILE | 11kV | INCOM... The goose usage for client-server relation is missing for Automation/Mapping at client level (server, client)-> [Scs | Ether...
22148 DatapointClient ALTOMATION | AGILE | 11kV | INCOM... The client-server relation is missing (server, client)-> [Scs | Ethernet network | C264-1, Scs | Ethernet network | C254]
Checks
Graphic area
Traces

CHECK RESULT TABLE

Table rows:

- Each row corresponds to one check operation whose result is an error or a warning or information.

Table columns:

- **First column:**
  The user can check On/Off this column to remember which error/warning he tried to correct.
- **Level:**
  Icon of error, warning or info.
- **Code:**
  Identifier of the error, warning or info message. Each code and its level are defined below.
- **Type:**
  Identifier of the check operation.
  Example: "CircuitBreaker" is a check consisting in verifying the configuration of a Circuit breaker (missing datapoints, …).

– **Reference:**
For each check operation, an Object implicated in the check operation, is considered as the main Object. The column displays the external Id of this Object. If the user activates the "**Reach**" action on the row, this Object is retrieved in the SCE browsers and selected.

– **Message:**
It displays a message explaining the error/warning/info for the check operation.

The panel of the Table contains also the following buttons:

– **Errors filter toggle button:**
If the button is selected, the Error traces are not displayed (they are filtered). Else they are.

– **Warnings filter toggle button:**
If the button is selected, the Warning traces are not displayed (they are filtered). Else they are.

– **Info filter toggle button:**
If the button is selected, the Info traces are not displayed (they are filtered). Else they are.

– **Checked traces filter toggle button:**
If the button is selected, the Checked traces are not displayed (they are filtered). Else they are.

2.2 Graphic symbols used in this document

Check messages are written here with the following indications:

⇒ the Error ( ) or Warning ( ) flag

⇒ the error or warning code

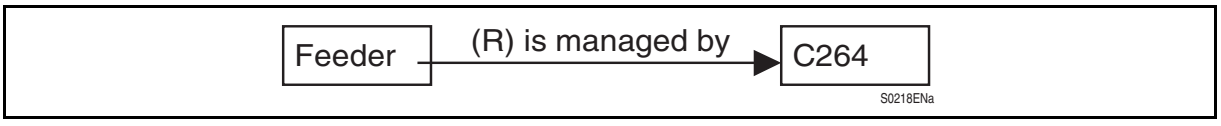
⇒ the check identification

⇒ the check message

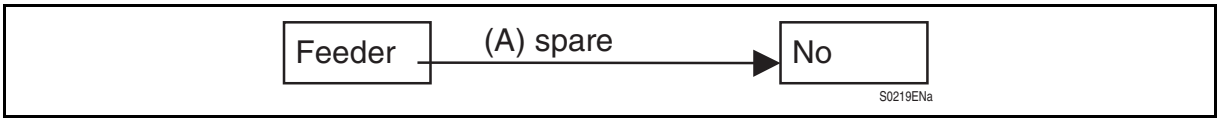
The User Interface of the check table is described in the User Manual of the SCE.

Relation and Attribute representation in figures:

⇒ A relation is marked with a (R).
In the example below, the "Feeder" is linked to the MiCOM C264 bay computer by the "is managed by" relation.



⇒ An attribute is marked with a (A).
In the example below, the "spare" attribute of the "Feeder" is set to the "No" value.



The configuration of Relations and Attributes is described in the User Manual of PACiS SCE.

2.3 General checks

2.3.1 Internal error

In case of an exceptional error, internal to the check process, the stack trace is displayed with the following message:

00001 / CheckAbort / Check internal error

2.3.2 Objects in Temporary area

The temporary area must not contain any object which is not spare.

01002 / TemporaryObjects / There are objects in temporary area

2.3.3 Capacity limits

The two following lists are taken from the document PS01.

Component		Maximum authorised
OI client on a per OI server basis	(1)	8
OI server		1+ 1 redundant
Printers OI level		4 (* 2 if redundant)
Printers computer level	(1)	C264/C264C/C264P: 1
IED on a per Legacy Bus basis	(1)	16
IEC equipments (Computers and Generic IEDs)		96
SCADA Networks in the system		16

For a whole PACiS system

Logical Plant Item			Maximum authorised
Substation (1)			40
Voltage Level			4 if ATCC used
Bays			512
Circuit breakers	(XCBR)		512
Disconnectors	(SWIT)		2048
Transformers	(TXF)	(2)	512
Generic modules			4096
Datapoints			48000
Digital Input Points	(SPS, DPS, MPS)		37500
Measurements	(MV)		7500
Counter			512
TPI			512
Output Control Points	(SPC, DPC)		5000
Setpoint Outputs (digital or analogue)			512
Run Report			255
LSP data point			300

(1) Locked by the Structural Database.

(2) The Structural Database locks the count of Transformers per Bay-Transformer to 1. So the maximum count of Transformers follows the count of Bay-Transformers.

Additional checks:

The check of the count of Symbols per "Comp. workspace" and per "Bay mimic" is described in section 2.6.4.1Symbols.

02003 / CapacityLimits / The count of … components is not valid (count, maximum)

Examples:

02003 / CapacityLimits / The count of OI server components is not valid (count, maximum)-> [3, 1]

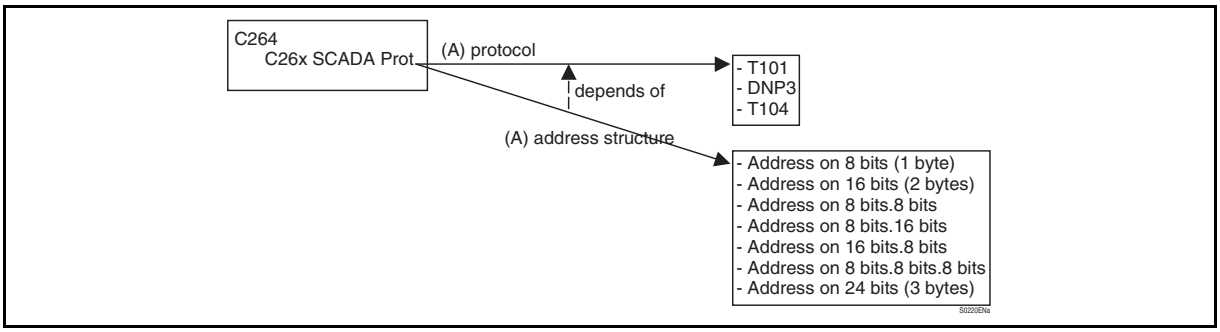
2.3.4 Variant attributes value

NOTE: These checks are not processed for backup devices.

An attribute value can be dependent of another attribute value.

In the following example, the "C26x SCADA Prot." has 2 attributes: "protocol" and "address structure".

The set of possible values for "address structure" depends on the selected value for "protocol".


C264
C26x SCADA Prot
(A) protocol
depends of
(A) address structure
- T101
- DNP3
- T104
- Address on 8 bits (1 byte)
- Address on 16 bits (2 bytes)
- Address on 8 bits.8 bits
- Address on 8 bits.16 bits
- Address on 16 bits.8 bits
- Address on 8 bits.8 bits.8 bits
- Address on 24 bits (3 bytes)
S0220ENa

At the User Interface, the modification of the "protocol" value may lead to an incompatible "address structure" value.

06101 / AttributeValue / The attribute value is not valid

Example:

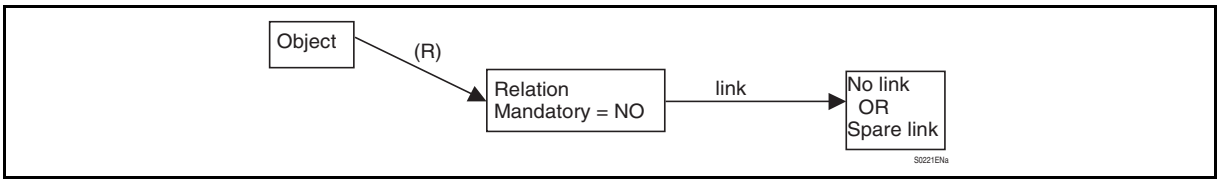
06101 / AttributeValue / The attribute value is not valid-> [Scs | Ethernet network | C264 | C26X SCADA prot | address structure]

2.3.5 Relations

NOTE: These checks are not processed for backup devices.

The check of a relation depends on its definition in the Structural Database.

- A "Mandatory" flag is set to NO on a relation for which the link can be omitted.



If the relation is not linked, then the following message is displayed:

03008 / RelationLinkNull / The optional relation has no link

Examples:

03008 / RelationLinkNull / The optional relation has no link-> [Site | Substation | Voltage level | Feeder | has for lock right: <null>]

If the relation is linked to a spare object, then the following message is displayed:

04010 / RelationLinkSpare / The optional relation has a spare link

Examples:

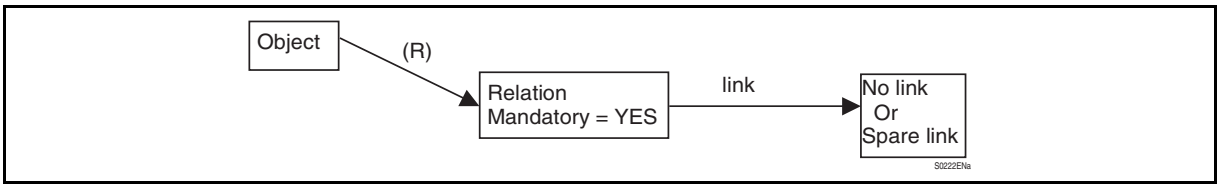
04010 / RelationLinkSpare / The optional relation have a spare link-> [Site | Substation | Substation DPC | has for AutoManu dependency: Substation DPS]

Some optional relations may have a specific rule which doesn't produce a warning if not filled. These rules are listed below:

– C26x SCADA protocols have the relation with a "main comm. port" which hasn't to be filled in case of T104 protocol,

– GHU200 Boards have a relation with a workspace which hasn't to be filled when HMI type is Simple.

A "Mandatory" flag is set to YES on a relation for which the link is mandatory.



If the relation is not linked, then the following message is displayed:

03007 / RelationLinkNull / The mandatory relation has no link

This check is not treated if the relation is:

– a UCA2 addressing relation

– a "UserFunction_RunsOn_PLC" of an Interlock FBD that belongs to a bay managed by an IED 61850 no PACiS

Examples:

03007 / RelationLinkNull / The mandatory relation has no link-> [Site | has for Bypass right: <null>]

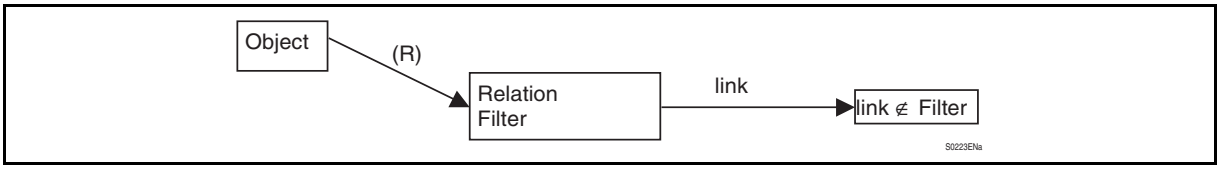
If the relation is linked to a spare object, then the following message is displayed:

04009 / RelationLinkSpare / The mandatory relation has a spare link

Examples:

04009 / RelationLinkSpare / The mandatory relation have a spare link-> [Site | Substation | Substation DPC | has for profile: DPC profile]

– If a filter is defined for a relation, the link must be compatible with the filter definition.



05011 / RelationLinkFilter / The relation link is not compatible with the filter

Examples:

05011 / RelationLinkFilter / The relation link is not compatible with the filter-> [Site | Substation | Voltage level | Feeder 1 | circuit breaker | Comp. swit. pos. | 'open' wired on: DI # 0]

2.3.6 Templates

The goal of these checks is to warn user about template coherency. For templates, check if all components are present in all instances or clones.

This check indicates the template and instance concerned, and the component which are missing. If the component is a template clone, indicate only the main template.

The way to correct this error is to delete the missing component in the template and to recreate it.

68213 / Templates / One instance of the template is not coherent with the template definition (Template, Instance, missing component)

Example:
68213 / Templates / One instance of the template is not coherent with the template definition (Template, Instance, missing component) -> [Site-Feeder-Feeder1 | Feeder1, Site | Substation | Voltage level | Feeder 1, Circuit breaker]

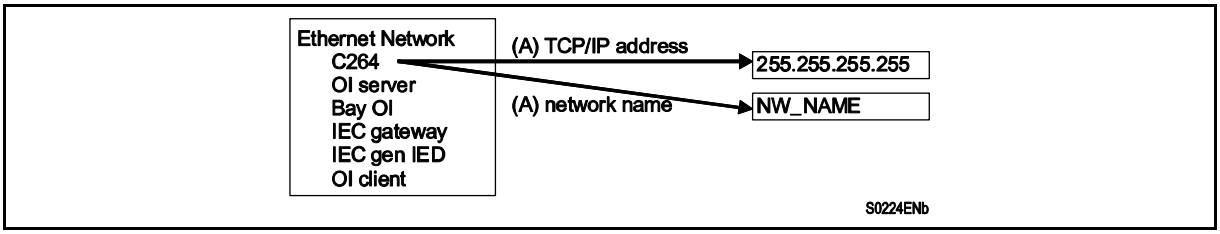
68215 / Templates / One instance of the template is not coherent with the template definition, a root component is missing (Template, Instance, missing component)

A template can only use 1 sub-level of template, i.e. a maximum level of inner template is 2.

68254 / Templates /Number of inner templates reached (number, maximum)

2.4 System checks

2.4.1 TCP/IP definition on Ethernet Network



Each device connected to an Ethernet Network has 2 attributes "TCP/IP address" and "network name".

⇒ The "TCP/IP address" value of a device, must be unique among all the devices per Ethernet Network.

⇒ The "network name" value of a device, must be unique among all the devices per Ethernet Network.

⇒ The network name (alias TCP/IP) must not be reserved by operating system.

Exception:

The unicity is not required between an OI server and an OI client embedded in the same physical device. Therefore, if an "OI client" is linked to an "OI server" through the relation "has for HMI server", then it's not checked.

07012 / TCPIPattribute / The attribute value is not unique

Examples:

07012 / TCPIPattribute / The attribute value is not unique-> [TCP/IP address, 255.255.255.255]

07012 / TCPIPattribute / The attribute value is not unique-> [network name, NW_NAME]

07164 / TCPIPattribute / The network name is reserved by operating system

2.4.2 SNTP servers

On SCS object, it is possible to configure the TCP/IP addressing for SNTP server (primary and auxiliary addresses).

This addresses may reference an existing device in database or a devices outside the PACiS system.

Some rules must be followed for these addresses.

If one of both IP addresses is configured and represent a PACiS device, this device must be a computer.

07249 / TCPIPattribute / The PACiS SNTP server must be a computer (IP address, device)

If auxiliary IP address is configured primary address must be configured too.

07250 / TCPIPattribute / The primary SNTP address must be configured if auxiliary is configured

Primary and auxiliary addresses must be different when configured.

07251 / TCPIPattribute / The two SNTP addresses must be different (IP address)

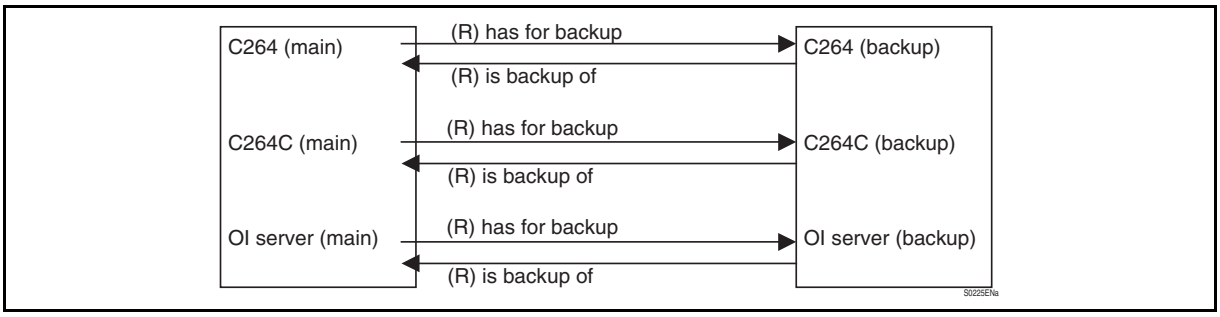
If the SNTP server (main or auxiliary) is a computer, the datapoint “External clock status” is mandatory for it:

07292 / TCPIPattribute / The datapoint “External clock status” is required on the computer running a SNTP server service

2.4.3 IEC61850 Physical Devices

2.4.3.1 Redundancy

2.4.3.1.1 PACiS redundancy



- For a device, the relations "has for backup" and "is backup of" are mutually exclusive.

30044 / Redundancy / The relation types are not compatible-> [has for backup, is backup of]

A main and its backup must be devices of the same type.

30073 / Redundancy / The main and the backup are not of the same type

Examples:
30073 / Redundancy / The main & the backup are not of the same type-> [OI server, C264]

2.4.3.1.2 C264 Standalone redundancy

Redundancy of a C264R is managed by the attribute “number of masters”. If it is set to 2, it is considered as redundant.

A redundant C264 Standalone mustn’t manage Isagraf or FBD functions.

- 78267 / C264R / A redunded C264R mustn’t manage Isagraf or FBD functions.

2.4.3.1.3 Incompatible component for redundant computer

For a redundant C264 the objects that follow are not compatible:

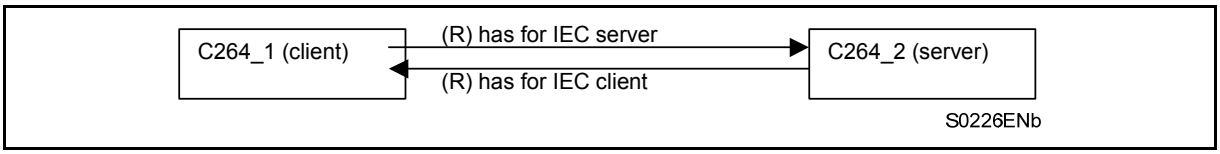
– TMU 210 Board

30297 / Redundancy / Scs | Ethernet network | C264 | TMU210 / Not compatible component on a C264 redounded

2.4.3.2 Client - Server relation on IEC61850

NOTE: These checks are not processed for backup devices.

- A Client must not be linked to the same Server through multiple relations "has for IEC server".



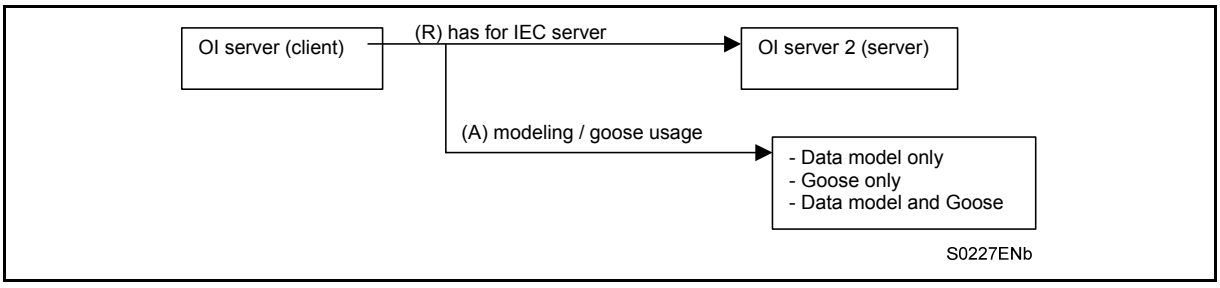
08013 / RelationClientServer / Multiple links to the same server

Examples:

08013 / RelationClientServer / Multiple links to the same server-> [has for IEC server: C264_2]

- Case of "OI server" Client:

The attribute "goose usage", of the relation "has for IEC server", must be set to the "Data model only" value.

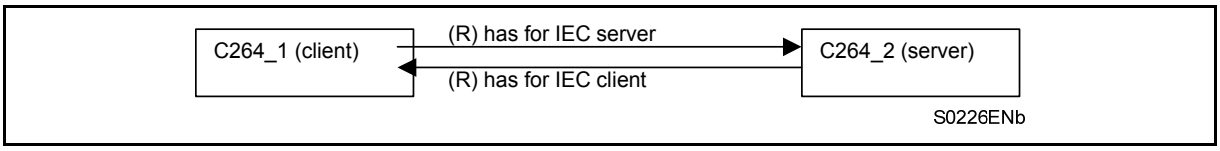


08107 / RelationClientServer / The relation attribute value is not valid. It must be: Data model only

Examples:

08107 / RelationClientServer / The relation attribute value is not valid. It must be: Data model only-> [has for IEC server: OI server, modelling/goose usage = Goose only]

- for a relation client-server with data model usage = data model with or without GOOSE, a MICOM C264 cannot have more than 10 clients and/or 16 servers. The client-server relations with GOOSE only are out of the scope of this rule.



<08141> / RelationClientServer / More than 10 clients for the same computer server

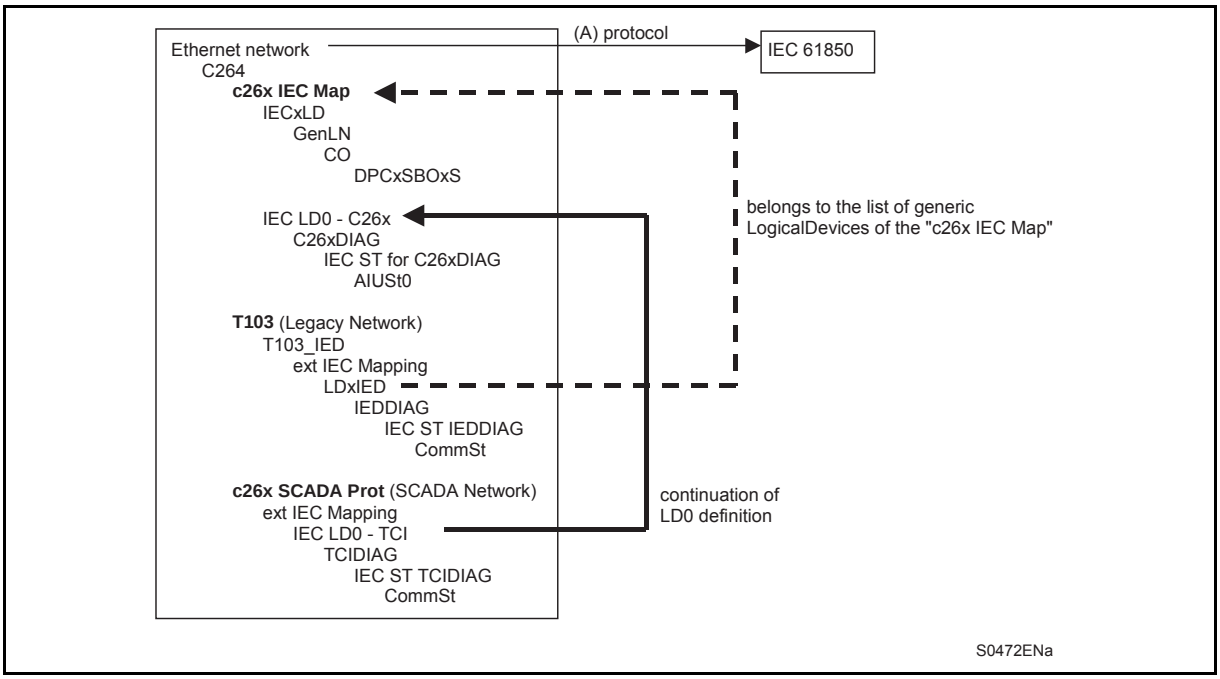
<08140> / RelationClientServer / More than 16 servers for the same computer client

2.4.3.3 IEC61850 Mapping on Ethernet Network

2.4.3.3.1 Mapping definition

NOTE: These checks are only processed for non-backup devices.

Example of IEC61850Mapping in a Computer:



- For each Physical Device on the "Ethernet network":
  - **1**, and only 1, IEC61850 Mapping, is allowed.
  - this Mapping must be compatible with the value ("IEC61850") set to the "protocol" attribute of the "Ethernet network".

13110 / EthernetMapping / The component is missing

13109 / EthernetMapping / The component is not allowed

Examples, for an IEC61850 "Ethernet network" protocol:

13109 / EthernetMapping / The component is not allowed-> [C26x IEC Map.]

- For each Legacy Device on a Legacy Network and, for each SCADA Network:
  - **1**, and only 1, IEC61850 extended Mapping, is allowed.
  - this extended Mapping must be compatible with the value ("IEC61850") set to the "protocol" attribute of the "Ethernet network".

13110 / EthernetMapping / The component is missing

13109 / EthernetMapping / The component is not allowed

Examples, for an "IEC61850" protocol:

13109 / EthernetMapping / The component is not allowed-> [ext IEC Mapping]

- For each Logical Device defined under the IEC Mapping:
  - its name must be unique in the mapping. LD name is prefixed by Alias TCP IP and by IED name (uniquely for legacy IED LD).
  - For PACiS IED, if the Logical Device is a generic one, its name must not contain the sub-string "LD0" (reserved for system Logical Devices).

Examples:

In the "c26x IEC Map" mapping: "IECxLD" name must be unique among all the generic Logical Devices of the "c26x IEC Map" + of all the "ext IEC Mapping" of Legacy Devices, and it must not contain the sub-string "LD0".

13020 / EthernetMapping / The name is not unique

13021 / EthernetMapping / The name is not valid

Examples, for an IEC61850 "Ethernet network" protocol:

13020 / EthernetMapping / The name is not unique-> [LD]

13021 / EthernetMapping / The name is not valid-> [genLD0]

- For each Brick/LogicalNode defined under a Logical Device:
  - its name must be unique in the Logical Device

Examples:

- In the "c26x IEC Map" mapping:
  "GenLN" name must be unique among all the Logical Nodes of the "IECxLD" Logical Device.
  "C26xDIAG" and "TCIDIAG" names must be unique among all the Logical Nodes of the "LD0" Logical Device (i.e., among all the Logical Nodes of "IEC LD0 - C26x" + of "IEC LD0 - TCI").

13020 / EthernetMapping / The name is not unique

- For each Data Object defined under a Functional Component (CO):
  - its name must be unique in the Functional Component

Examples:

- In the "c26x IEC Map" mapping:
  "DPCxSBOxS" name must be unique among all the Data Objects of the "CO" Functional Component.

13020 / EthernetMapping / The name is not unique

- For each Data Object defined under a Functional Component:
  - Only **one** relation "has for IEC address" is allowed (0 or 1)

27113 / EthernetAddressing / Multiple links

- For the following Functional Component types of a C264:
  - MX
  - ST
    the maximum count of DataObjects is **50**.

02003 / CapacityLimits / The count of DataObject components is not valid (count, maximum)

Examples:

02003 / CapacityLimits / The count of DataObject components is not valid (count, maximum)-> [101, 100]

2.4.3.3.2 IEC Goose

For a given C264, the size of the goose for SPS,DPS, MPS must be less or equal to 1250 bytes. Idem for the size of the goose for measurements and counters.

<54142> / GooseLimits / Goose limit is reached for binary inputs

<54143> / GooseLimits / Goose limit is reached for measurements

For a given C264 the size of the goose for LSP must be less or equal to 3750 bytes.

<54243> / GooseLimits / Goose limit is reached for LSP

In a database, all Goose ID must be unique for a network.

58170 / GooseUnicity / Goose ID (AppID) must be unique for network

2.4.3.3.3 IEC Goose of Functional Components ST or MX

<xxxxx> / Goose ranks contiguous

When a DtObj shows as NOT 'transmitted by goose', its Goose rank sets to an undefined value or

When there is a gap in the Goose ranks and they are not contiguous as occurs in event of DtObjs not 'transmitted by goose' any more.

<xxxxx> / Goose ranks identical

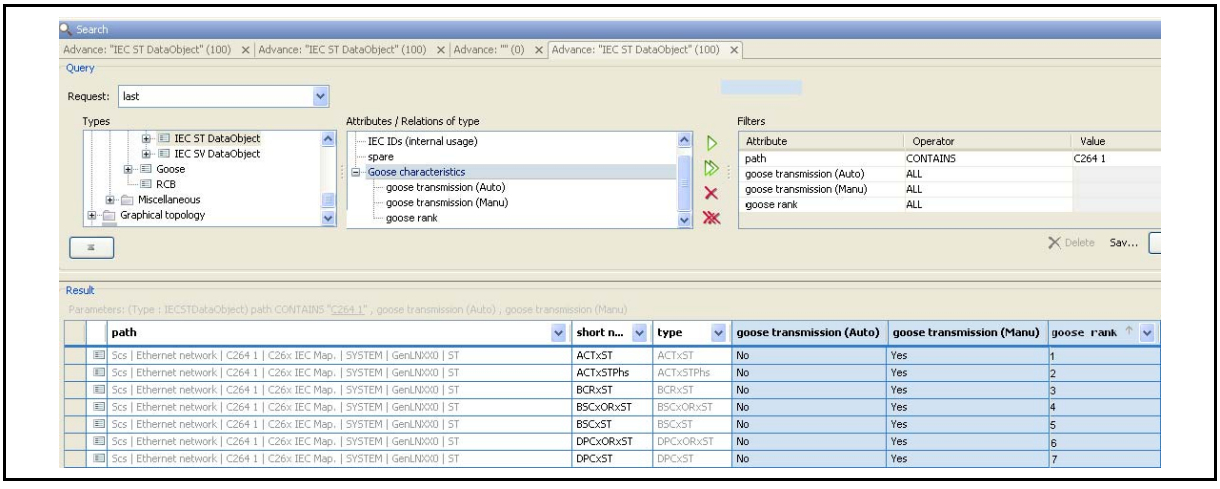
When the Goose rank is identical for two DtObjs.

<xxxxx> / Goose ranks not allocated

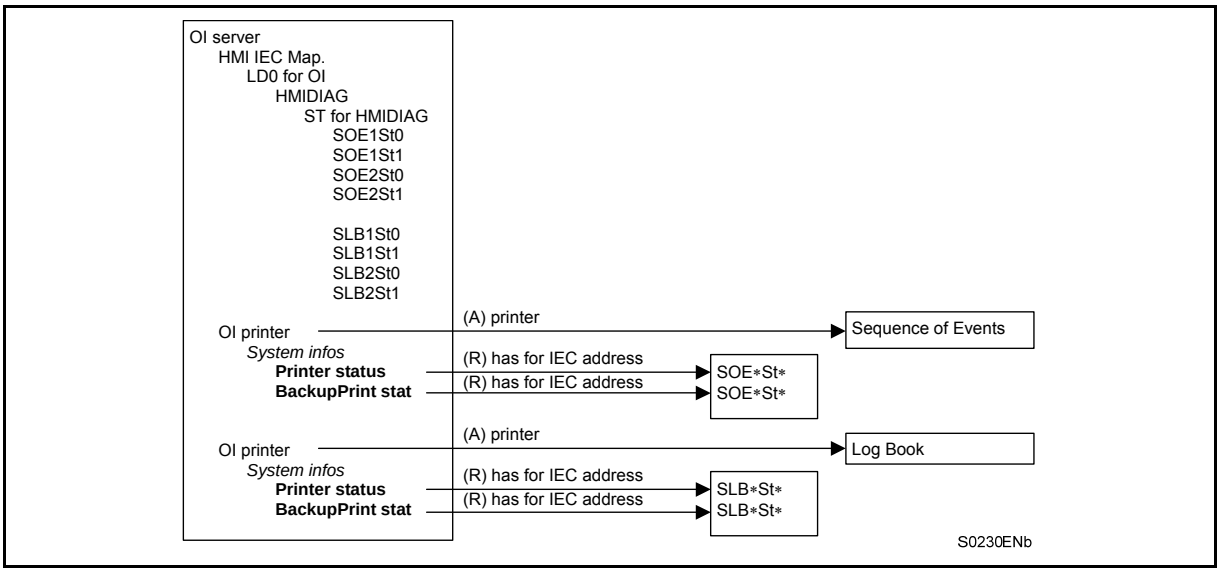
When some DataObjects have their Goose Rank to 0.

You can fix it using the SCE search with Types= IEC STDataObject (or MXDataObject) and Attibutes = Goose characteristics

Change the value ‘goose rank’ directly in the table. Please refer to the snapshot that follows.



2.4.3.3.4 Addressing of OI printer System Datapoints

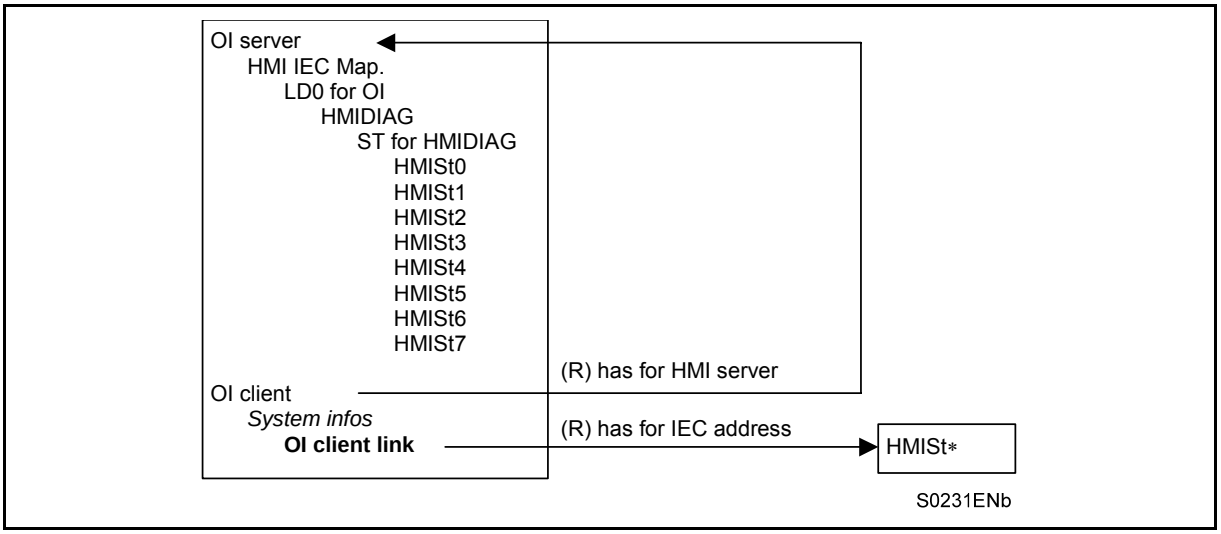


- If the "OI printer" has its attribute "printer type" set to the "Sequence of Events" value, then its system Datapoints "Printer status" and "BackupPrint stat." must be linked to an IEC address named "SOE∗St∗". Only 1 relation is allowed.
- If the "OI printer" has its attribute "printer type" set to the "Log Book" value, then its system Datapoints "Printer status" and "BackupPrint stat." must be linked to an IEC address named "SLB∗St∗". Only 1 relation is allowed.

27050 / EthernetAddressing / The relation link is not valid

27113 / EthernetAddressing / Multiple links

2.4.3.3.5 Addressing of OI client System Datapoints



- The system Datapoint "OI client link" of an "OI client" must be linked to an IEC address named "HMISt∗". Only 1 relation is allowed.

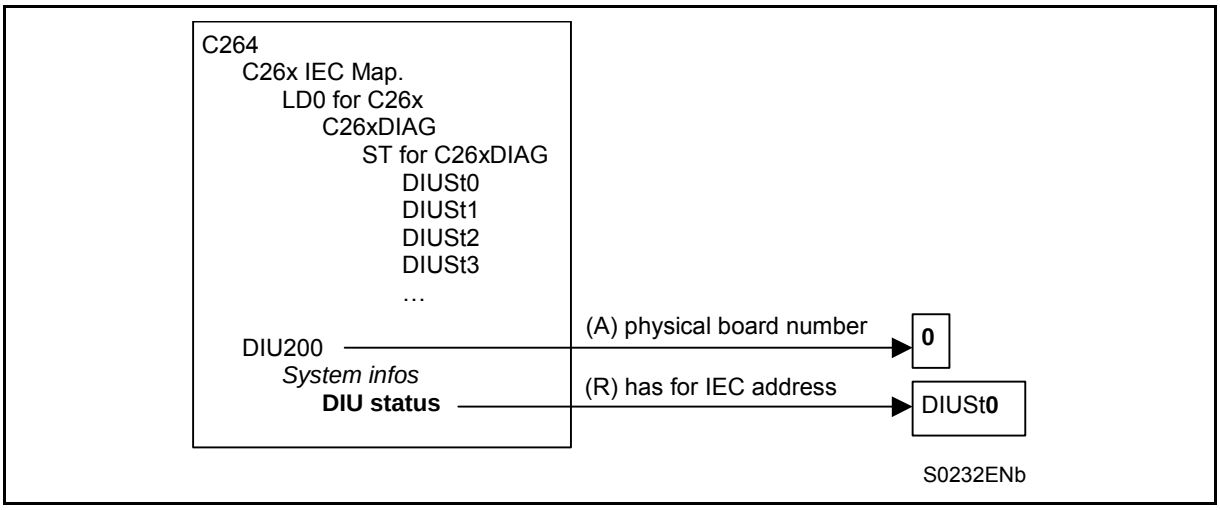
27050 / EthernetAddressing / The relation link is not valid

27113 / EthernetAddressing / Multiple links

Example:

27113 / EthernetAddressing / Multiple links-> [has for IEC address : HMISt0]
27113 / EthernetAddressing / Multiple links-> [has for IEC address : HMISt2]

2.4.3.3.6 Addressing of Computer boards Status Datapoints



- The status Datapoint of a Computer board must be linked to an IEC address with a name matching the board type and ending with the value of the attribute "physical board number". Only 1 relation is allowed.

27067 / EthernetAddressing / The address in not compatible with the board number

Example:

27067 / EthernetAddressing / The address in not compatible with the board number-> [has for IEC address: DIUSt1, DIU200.physical board number = 0]

2.4.3.4 C264 Boards

NOTE: These checks are only processed for non-backup Computers.

- Count of boards in a C264 computer:

A	B	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
BIU	CPU																

Slots from 1 to 14 may contain a board of the following types:

- AIU200, AIU210, AIU211
- DOU200
- DIU2xx
- CCU20x
- AOU200

Slot 15 may contain 1 TMU200/TMU210/TMU220 board or 1 board of the above types.

If a TMU200/TMU220 is present, then the maximum count of boards must be ≤ **14**

If a TMU210 is present, then the maximum count of boards must be ≤ **13**

else the maximum count of boards must be ≤ **15**

- Count of boards in a C264C computer:

A	B	1	2	3	4	5	6
BIU	CPU						

Slots from 1 to 4 may contain a board of the following types:

- AIU200, AIU210, AIU211
- DOU200
- DIU2xx
- CCU20x
- AOU200

Slots 5, 6 may contain 1 TMU200/TMU210/TMU220 board or 2 boards of the above types.

If a TMU200/TMU220 is present, then the maximum count of boards must be ≤ **4**

If a TMU210 is present, then the maximum count of boards must be ≤ **3**

else the maximum count of boards must be ≤ **6**

09144 / ComputerBoards / The count of TMU boards is not valid (count, maximum)

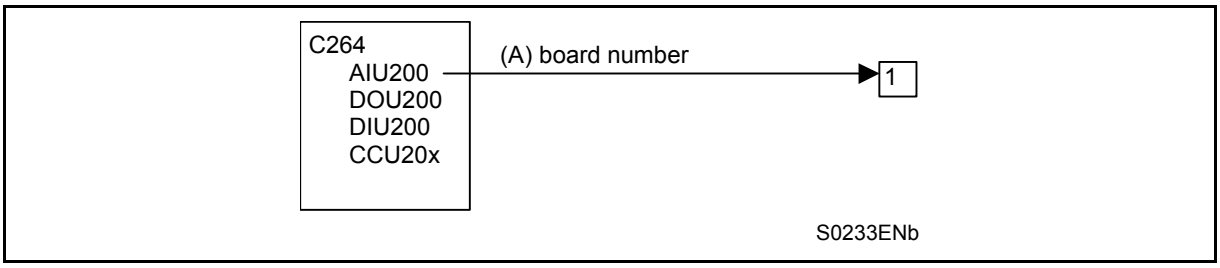
09145 / ComputerBoards / The count of AIU boards is not valid (count, maximum)

09003 / ComputerBoards / The count of Board components is not valid (count, maximum)

Examples:

09003 / ComputerBoards / The count of Board components is not valid (count, maximum)-> [6, 4]

- Attribute "physical board number" of a board.



For boards AOU200, AIU201, AIU210, DIU200, DIU210, DOU200, CCU200, the "board number" attribute values must be unique and contiguous. This board number is a physical number defined by the user.

For boards DIU211, DOU201, CCU211, (boards managing the slot number) the board number is a computed logical number. It is unique and contiguous by board type

09015 / ComputerBoards / The attribute value is not unique for the board type

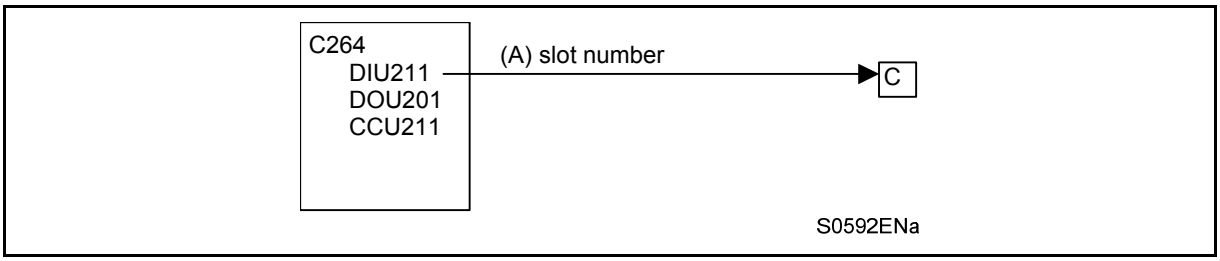
09016 / ComputerBoards / The attribute values are not contiguous for the board type (board type, attribute)

Examples:

09015 /ComputerBoards / The attribute value is not unique for the board type-> [physical board number, 1]

09016 / ComputerBoards / The attribute values are not contiguous for the board type (board type, attribute)-> [CCU200, physical board number]

- Attribute "slot number" of a board managing the slot number.



For boards managing the slot number, the "slot number" attribute values must be unique.

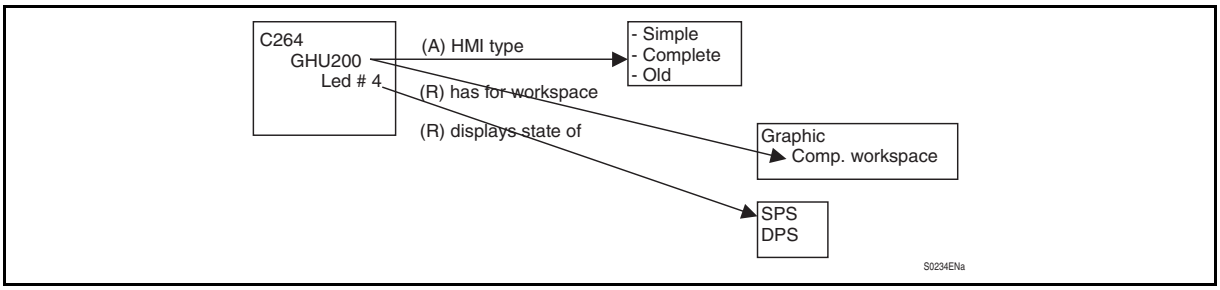
09282 / ComputerBoards / The attribute value is not unique for boards of rack

Example:

09282 / ComputerBoards / The attribute value is not unique for boards of rack -> [slot number, C]

- GHU200 board.

The GHU200 board has an attribute "HMI type" and a relation "has for workspace".



– If the value of the "HMI type" attribute is different from "Complete", then the relation "has for workspace" must not be linked:

09078 / ComputerBoards / The relation link is not compatible with the board type-> [has for workspace: Comp. workspace, HMI type = Simple]

– If the AVR panel is configured, the computer must manage an AVR function:

09304 / *Computer* Boards / The usage of the AVR panel is allowed only if computer manage an AVR function

– If the AVR panel is used as default panel for start or inactive, the AVR panel must be configured:

09305 / Computer Boards / The usage of the AVR panel as default is allowed only if AVR panel is configured

If the default panel for start or inactive is Graphical Bay Panel ‘n’, ‘n’ must be lesser or equal to number of Graphical Bay Panel configured:

09306 / ComputerBoards / The usage of the graphical bay panel 'n' as default is allowed only if up to 'n' graphical bay panel are configured (number of graphical bay panel) -> [12]

– If the value of the "HMI type" attribute is "Simple", then "Led#5" must not be used (no relation link from "Led#5" to a Datapoint):

35077 / BoardLeds / The use of this LED is incompatible with the board type (type)-> [HMI type = Simple]

– If the value of the "HMI type" attribute is "Simple", Led object can't has "displays state of " relation with attribute "Led behaviour" equals to "used for alarm":

35217 / BoardLeds / The attribute "Led behavoir" on relation "has displays state" can be "used for alarm" only when GHU200 board is "Complete".

– A led can be used by a data point only if this data point is managed by the same computer than the computer bearing the led:

35227 / BoardLeds / Board led can be use only by data point managed by the led server

– Only led #14 to led #17 can be used by a data point if the led allocation is set to predefined at the GHU board level:

35281 / BoardLeds / The use of this LED is incompatible with the predefined led allocation

- TMU200, TMU210 and TMU220 boards

These boards are exclusive one another for the same computer.

<09139> / ComputerBoards / TMU200, TMU210 and TMU220 can not belong to the same computer.

- TMU210 board

When used, its DO channel can only be wired to the open or close states of the Switch Control DPC of a breaker.

The DO#1 can be wired on open state and DO#5 on closed state.

09180 / ComputerBoards / DO channels of TMU210 can only be used for open (DO_1) or close (DO_5) states of the Switch Control DPC of a breaker

When used, the protection function "automatism" is mandatory because the SPS "synthesis of instantaneous" defined under it is mandatory.

This check is not done for following cases:

- SCE is 'Poste d' application (i.e., lax flag sce.Poste_d is set).

- an internal Synchrocheck of type 2 is configured on the SCE

09197 / ComputerBoards / when TMU210 is configured, protection function "automatism" is mandatory for SPS "synthesis of instantaneous"

- CPU260/CPU270 board

When ports 3 and 4 are both used, they must have same baud rate.

<09201> / ComputerBoards / Port 3 and 4 of CPU260 must have same baud rate when used.

- AOU200 board

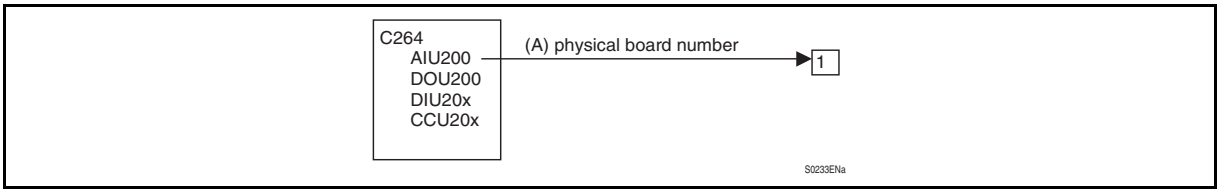
When a C264 is configured as redundanct, AOU200 board is not allowed.

<09270> / ComputerBoards / When a computer is redunded, AOU200 board is not allowed.

2.4.3.5 Computer extension racks

NOTE: These checks are only processed for non-backup computers.

- Attribute "rack number" of an extension rack.



For the set of the extension racks of a computer, the "rack number" attribute values must be unique and contiguous.

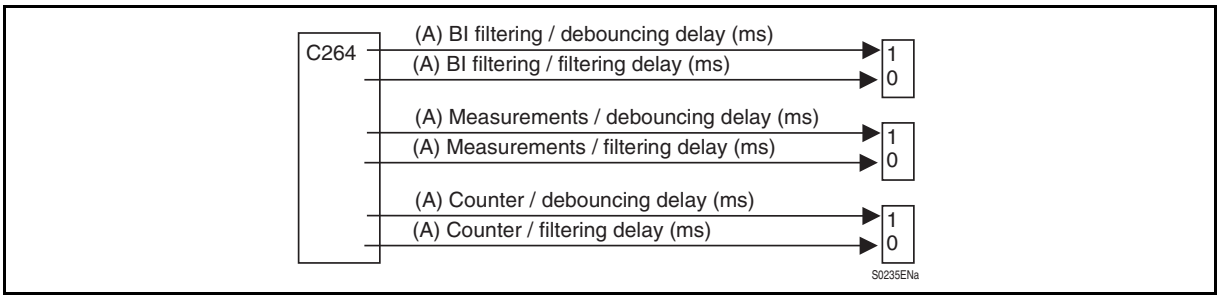
80279 / Extension rack / The attribute value is not unique for the extension rack

80280 / Extension rack / The rack numbers are not contiguous

2.4.3.6 Computer Settings

NOTE: This check is only processed for non-backup computers.

A computer has the following attributes:


C264
(A) BI filtering / debouncing delay (ms)
(A) BI filtering / filtering delay (ms)
(A) Measurements / debouncing delay (ms)
(A) Measurements / filtering delay (ms)
(A) Counter / debouncing delay (ms)
(A) Counter / filtering delay (ms)
1
0
S0235ENa

For each attribute category (BI filtering / Measurements / Counter), if the attribute "debouncing delay" is set to value **0**, then the attribute "filtering delay" must be set to value **0**.

10096 / ComputerSettings / The attribute values are not compatible

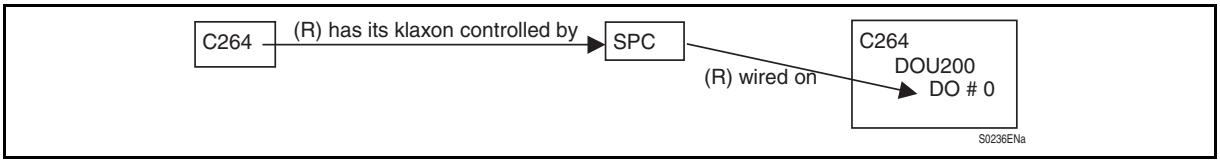
Examples:

10096 / ComputerSettings / The attribute values are not compatible-> [BI filtering/deboucing delay (ms), BI filtering/filtering delay (ms)]

2.4.3.7 Computer Klaxon

NOTE: This check is only processed for non-backup computers.

A computer may have the following relation:



The "SPC" link of the relation "has its klaxon controlled by" must be wired on a DO channel of the Computer.

10033 / ComputerSettings / The relation link is not a wired datapoint

10034 / ComputerSettings / The relation link is not a datapoint wired on the Computer

Examples:

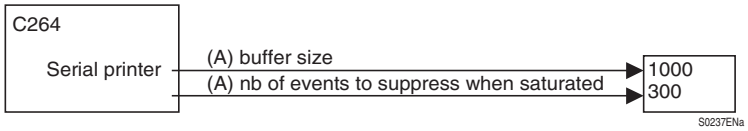
10033 / ComputerSettings / The relation link is not a wired datapoint-> [has its klaxon controlled by: Bay SPC

10034 / ComputerSettings / The relation link is not a datapoint wired on the Computer-> [has its klaxon controlled by: Bay SPC

2.4.3.8 Computer Printers

NOTE: This check is only processed for non-backup computers.

- Log Management attributes of a Serial Printer



The following constraint between the two attributes values must be respected:

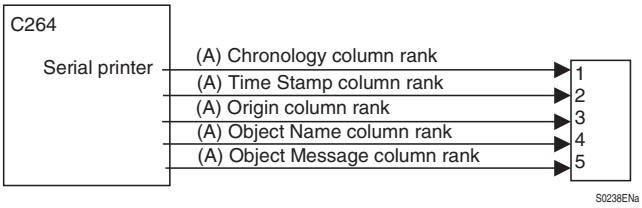
"buffer size" > "nb of events to suppress when saturated"

29105 / Printers / buffer size (events) is not greater than nb of events to suppress when saturated

Examples:

29105 / Printers / buffer size (events) is not greater than nb of events to suppress when saturated-> [200, 300]

- Printing format attributes of a Serial Printer



The value of each "… column rank" attribute must be unique.

29072 / Printers / The column rank is not unique

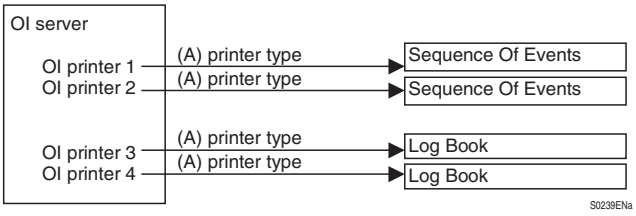
Example:

29072 / Printers / The column rank is not unique-> [Chronology column rank, Object Message column rank, Object Name column rank, Origin column rank, Time Stamp column rank, 1]

2.4.3.9 OI server Printers

NOTE: These checks are only processed for non-backup OI servers.

- Count of OI Printers for an OI server



For an "OI server": the maximum count of OI Printers, typed as "Sequence Of Events", is **2**.

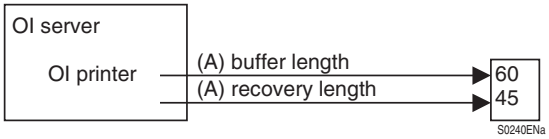
For an "OI server": the maximum count of OI Printers, typed as "Log Book", is **2**.

29004 / Printers / The count of OI printer components is not valid (type, count, maximum)

Examples:

29004 / Printers / The count of OI printer components is not valid (type, count, maximum)-> [Sequence Of Events, 4, 2]

- Log Management attributes of an OI Printer



The following constraint between the two attributes values must be respected:

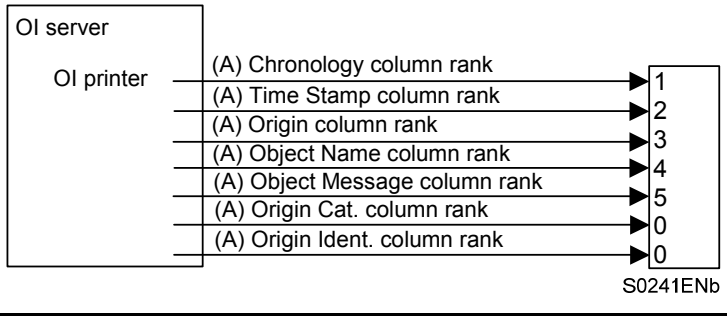
"buffer length" > "recovery length"

29105 / Printers / buffer length (s) is not greater than recovery length (s)

Examples:

29105 / Printers / buffer length (s) is not greater than recovery length (s)-> [60, 61]

- Printing format attributes of an OI Printer



The value of each "… column rank" attribute different than 0 must be unique.

The maximum number of characters by printing line is 154

29072 / Printers / The column rank is not unique

Example:

29072 / Printers / The column rank is not unique-> [Chronology column rank, Object Message column rank, Object Name column rank, Origin column rank, Time Stamp column rank, 1]

29203 / Printers / The size in character of the printing line is too long

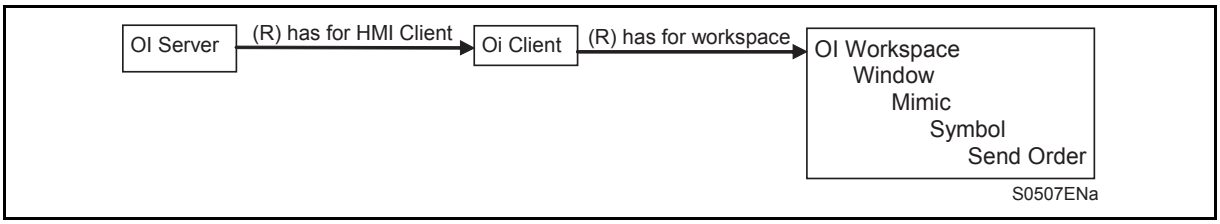
Example:

29203 / Printers / The size in character of the printing line is too long -> [205, 154]

2.4.3.10 OI server Symbols

NOTE : These checks are only processed for non-backup OI servers.

- Count of Send Order actions for an OI server



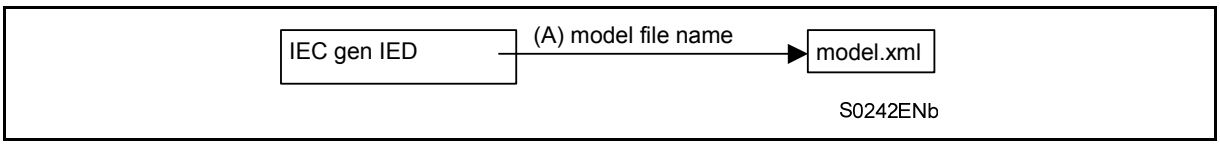
An OI Server can not manage more than 1024 Send Order in all of his mimics.

Count all Send Order of all mimics of all workspaces of all clients of the Server.

Doesn't treat a workspace twice if set as workspace of two clients.

02003 / CapacityLimits / The count of Send Order components is not valid (count, maximum)

2.4.3.11 IEC Gen IED data model reference



The value of the attribute "model file name" is mandatory.

34101 / DataModelReference / The attribute value is not valid-> [model file name]

2.4.3.12 Cyclic SPS

NOTE: This check is only processed for non-backup computers.

Up to eight cyclic SPS can be managed per computer basis

59003 / CalculatorCyclicSPS / The count of cyclicSPS components is not valid (count, maximum)

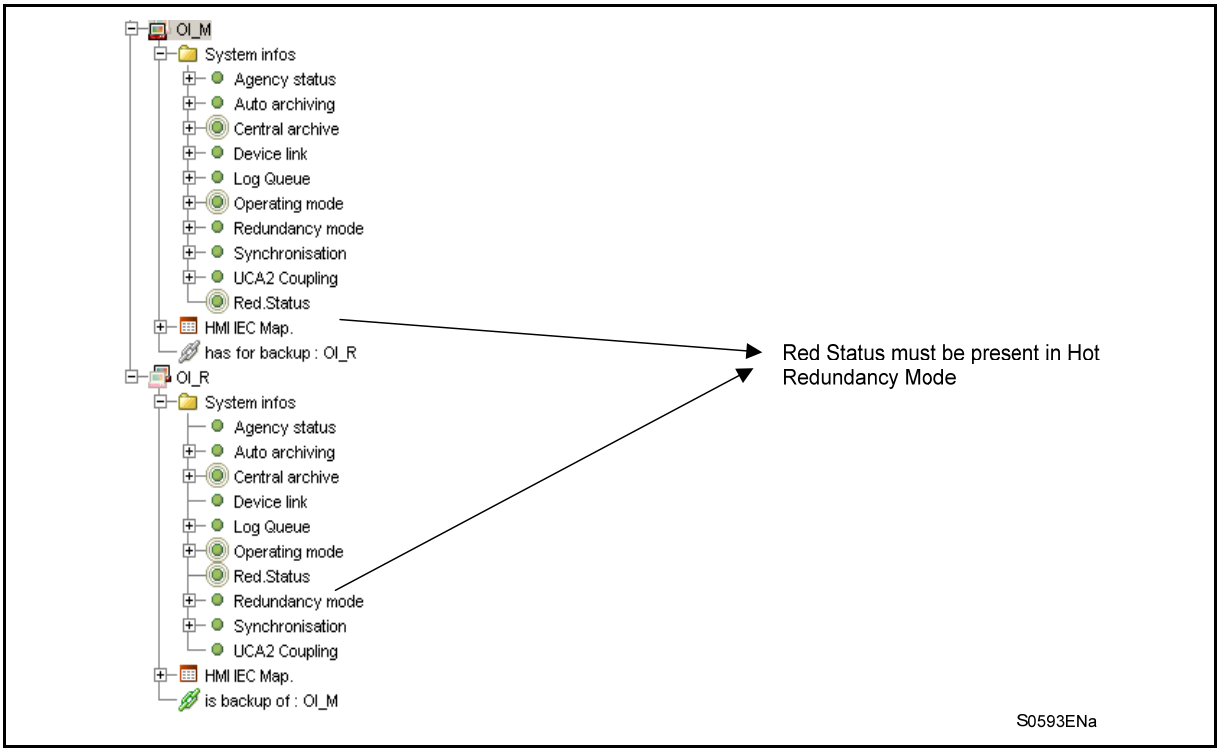
2.4.3.13 Computer AM Acquisition

For each C264 the delta between Delta between 'long AI scanning cycle' and 'short AI scanning cycle' must be greater or equals to 500 ms.

76263 / C264 AM Acquisition / Delta between 'long AI scanning cycle' and 'short AI scanning cycle' must be greater or equals to 500 ms.

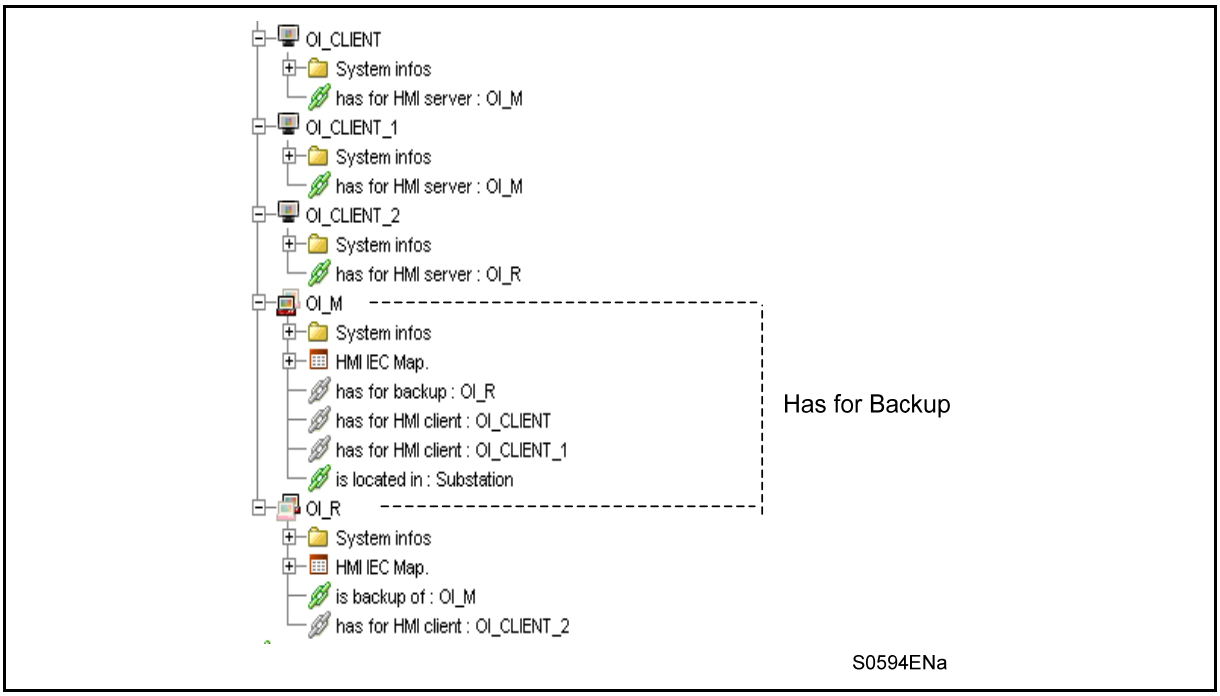
2.4.3.14 OI Server

- In Hot Redundancy mode the OI Server must have the datapoint 'Redundancy Status'



77258 / OI / On OI Server in Hot Redundancy mode datapoints Red.Status must be present under OI Server.

- In Hot Redundancy mode, if exist more than one OI Clients exists, each OI Server is HMI server for at least one OI client



77260 / OI / In Hot Redundancy mode if exist more than one OI Client, each OI Server is HMI server for at least one OI client.

2.4.4 Wave Records of MiCOM C264s

NOTE: These checks are only processed for non-backup MiCOM C264s.

2.4.4.1 Common check for fast and slow record

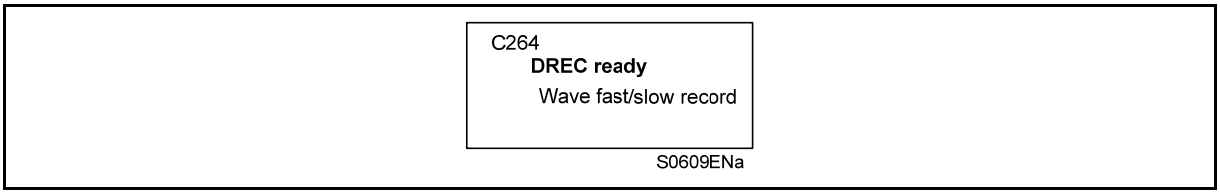
for a Fast or a Slow Wafeform, a datapoint can not be configurated more than once for the same relation (record, trigger and analog channel lists).

- *36195 / WaveRecording / multiple links to the same datapoint -> [external id of the relation]*

A Wave Record can only registrer data point wired physically on the same server tha the MiCOM C264which mange the Wave Record.

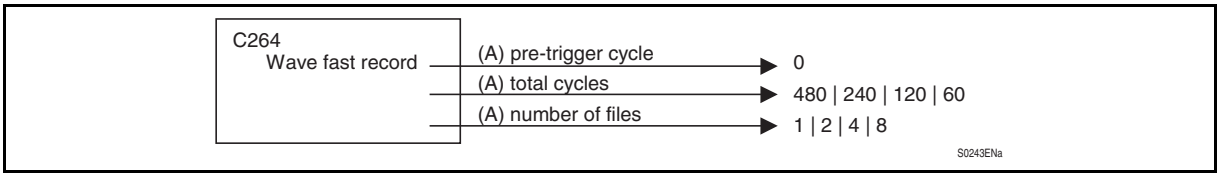
A Wave Record can only registrer data point managed by the same server than the C264 which mange the Wave Record, and not acquire on IED.

36234 / WaveRecording / Data point register by wave record must be managed by same C264 than wave record C264 and not acquire on IED -> [Path of the record relation]



36246 / WaveRecording / The datapoint 'DREC ready' must be present if a Wave recording is configured

2.4.4.2 Wave Fast Record



The following constraints between the attributes must be respected:

"pre-trigger cycle" ≤ "total cycles"

"number of files" ∗ "total cycles" ≤ 480 cycles

36102 / WaveRecording / pre-trigger cycle is greater than total cycles

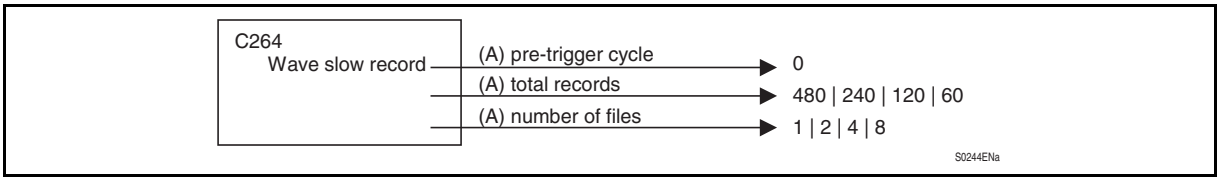
*36103 / WaveRecording / number of files * total cycles is not lower than 480*

Examples:

36102 /WaveRecording / pre-trigger cycle is greater than total cycles-> [2, 1]

*36103 / WaveRecording / number of files * total cycles is not lower than 480-> [8, 480]*

2.4.4.3 Wave Slow Record



The following constraints between the attributes must be respected:

"pre-trigger cycle" < "total records"

"number of files" * "total records" ≤ 5000 records

36103 / WaveRecording / pre-trigger cycle is not lower than total records

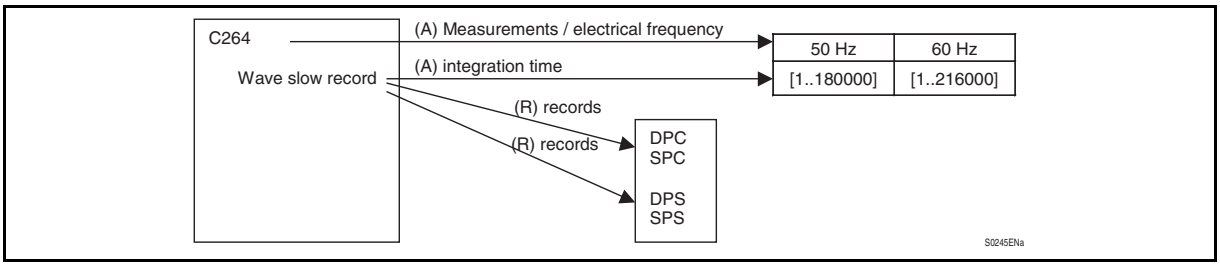
*36102 / WaveRecording / number of files * total records is greater than 5000*

Examples:

36103 / WaveRecording / pre-trigger cycle is not lower than total records-> [2, 1]

*36102 /WaveRecording / number of files * total records is greater than 5000-> [50, 1000]*

The following checks depend on the value of the attribute "electrical frequency":



- If "electrical frequency" ≡ 50 Hz:

– The "integration time" value must be in the range [1..180000].

– If the "integration time" value is > 5, then no DPC, SPC, DPS, SPS recording is allowed.

36104 / WaveRecording / integration time is not in the range [1..180000]

36129 / WaveRecording / The relation type is not allowed

Examples:

36104 / WaveRecording / integration time is not in the range [1..180000]-> [180001]

36129 / WaveRecording / The relation type is not allowed-> [records: Bay DPC]

- If "electrical frequency" ≡ 60 Hz:

– The "integration time" value must be in the range [1..216000].

– If the "integration time" value is > 6, then no DPC, SPC, DPS, SPS recording is allowed.

36104 / WaveRecording / integration time is not in the range [1..216000]

36129 / WaveRecording / The relation type is not allowed

Examples:

36129 / WaveRecording / The relation type is not allowed-> [records: Bay DPC]

A slow wave record is not compatible with a TMU210 board existing on the same MiCOM C264
36202/ WaveRecording / Slow wave record is not compatible with a TMU210 board usage

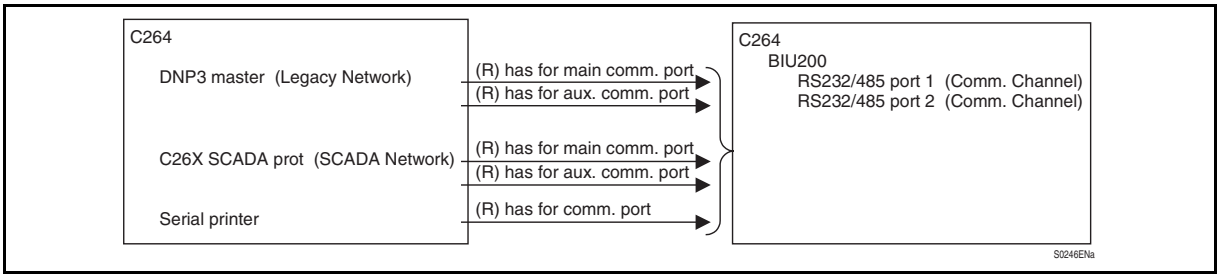
2.4.4.4 Triggers of Wave Record

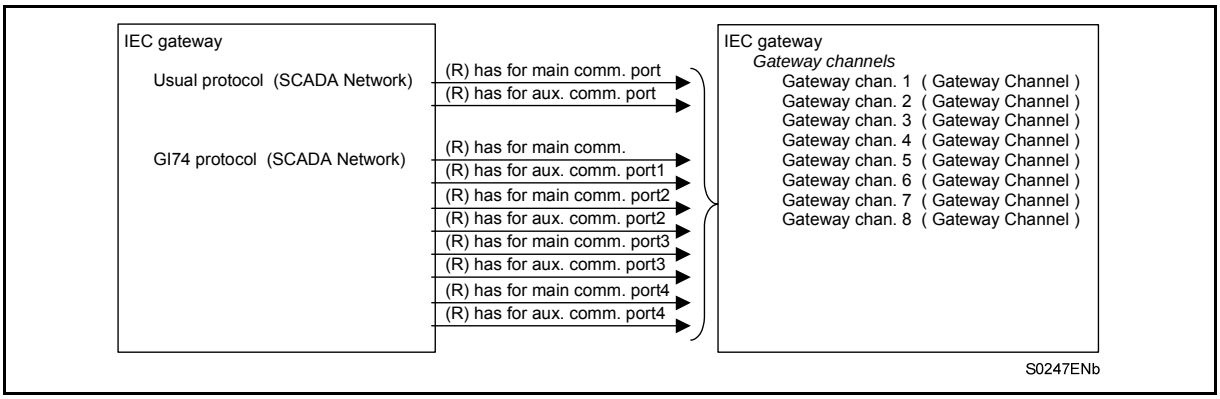
Any trigger datapoint of a given Wave record most have the same server than the MiCOM C264 managing this wave record.

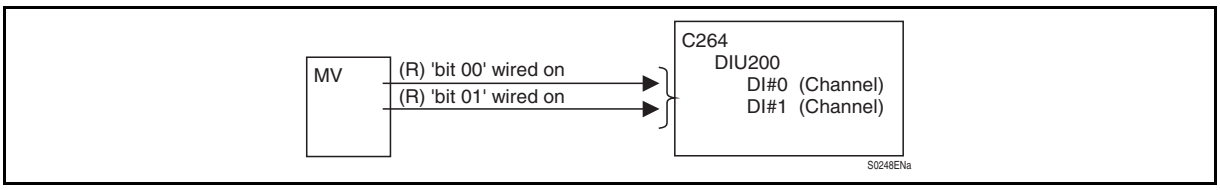
36223 / WaveRecording / *The trigger datapoint has not the same server as its associated wave record (servers)*

2.4.5 Channels

Example of relations connecting Legacy Network / SCADA Network / Serial Printer / Datapoint to a Channel:




IEC gateway
Usual protocol (SCADA Network)
GI74 protocol (SCADA Network)
(R) has for main comm. port
(R) has for aux. comm. port
(R) has for main comm.
(R) has for aux. comm. port1
(R) has for main comm. port2
(R) has for aux. comm. port2
(R) has for main comm. port3
(R) has for aux. comm. port3
(R) has for main comm. port4
(R) has for aux. comm. port4
IEC gateway
Gateway channels
Gateway chan. 1 (Gateway Channel)
Gateway chan. 2 (Gateway Channel)
Gateway chan. 3 (Gateway Channel)
Gateway chan. 4 (Gateway Channel)
Gateway chan. 5 (Gateway Channel)
Gateway chan. 6 (Gateway Channel)
Gateway chan. 7 (Gateway Channel)
Gateway chan. 8 (Gateway Channel)
S0247ENb



A Channel must be used only once.

11017 / RelationHasForCommPort / Multiple links to the same communication port

12018 / RelationHasForChannel / Multiple links to the same channel

Examples:

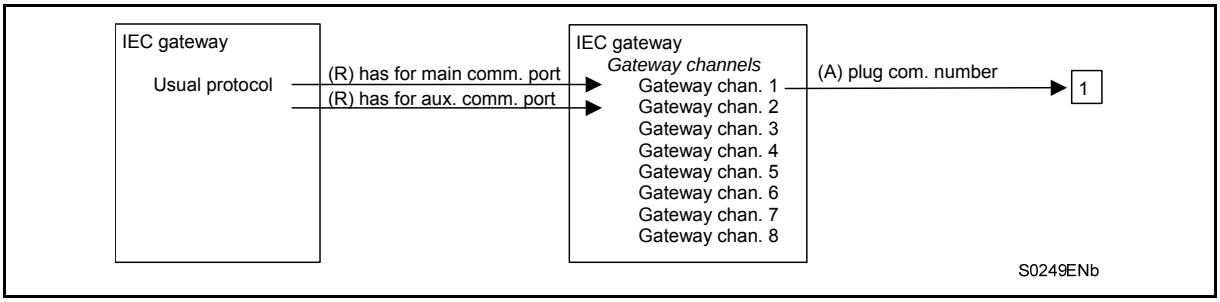
11017 / RelationHasForCommPort / Multiple links to the same communication port-> [is main comm. port of: C26X SCADA prot]

12018 / RelationHasForChannel / Multiple links to the same channel-> ['bit 00' channel for: Bay MV]

The T101-SAS Protocol can't have an auxiliary communication port.

11252 / RelationHasForCommPort / *Auxiliary communication port is not allowed for this protocol (comm. port)*

Attribute "plug com. number" of Gateway channels:



Under a Gateway, each channel used by a non-GI74 protocol, must have a unique value for its "plug com. number" attribute.

31019 / GatewayCommPorts / The attribute value is not unique for the gateway

Example:

31019 / GatewayCommPorts / The attribute value is not unique for the gateway-> [plug com. number, 1]

Attribute "baud rate" of Gateway channel:

Under a Gateway, channel baud rates 100, 200, 38400 are available only for T101 protocol.

31104 / GatewayCommPorts / Baud rate is not in the range [300..19200]

Channel baud rates 100, 200 are also available for SAS protocol.

31104 / GatewayCommPorts / SAS baud rate is not in the range [100..19200]

2.4.6 Legacy Networks

NOTE: These checks are not processed for Legacy Networks of backup devices.

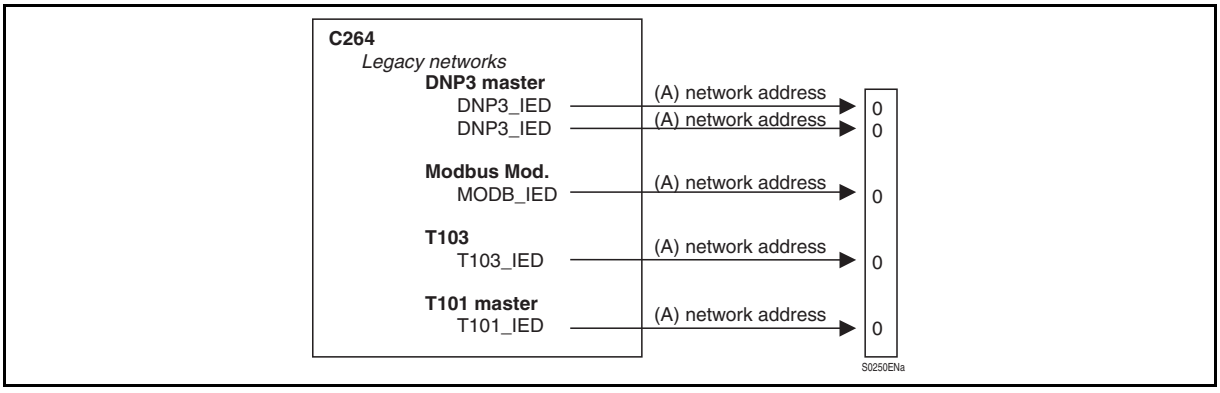
The general interrogation period of a T103 acquisition type should be equal to 0 or greater than 600 s

17276 / LegacyIED / *The general interrogation period should be equal to 0 or greater than 600 s*

The port *used* by a T103 legacy network must have an even parity.

17277 / LegacyIED / Even parity is required for T103 usage on the port

2.4.6.1 IEDs on Legacy Networks



For each IED, per Legacy Network:

- its "network address" attribute value must be unique
- its "short name" attribute value must be unique

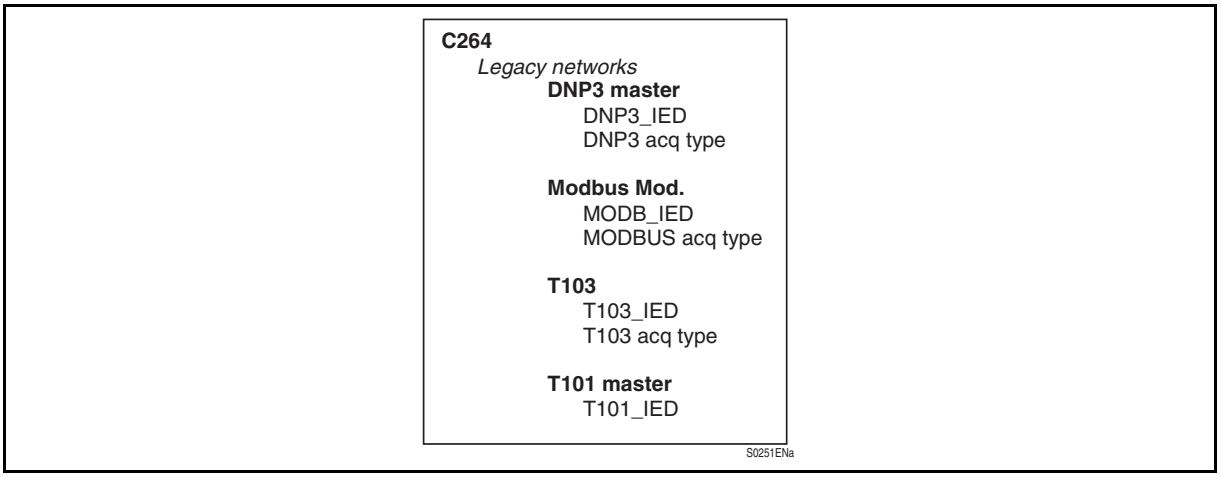
17035 / LegacyIED / The address of the IED is not unique on the Legacy Network

17036 / LegacyIED / The name of the IED is not unique on the Legacy Network

Examples:

17035 / LegacyIED / The address of the IED is not unique on the Legacy Network-> [network address, 0]

17036 / LegacyIED / The name of the IED is not unique on the Legacy Network-> [short name, DNP3_IED]



For each Device, and for all its Legacy Networks, the maximum count of "xxx acq type" components is **10**.

02003 / CapacityLimits / The count of IED acquisition type components is not valid (count, maximum)

Examples:

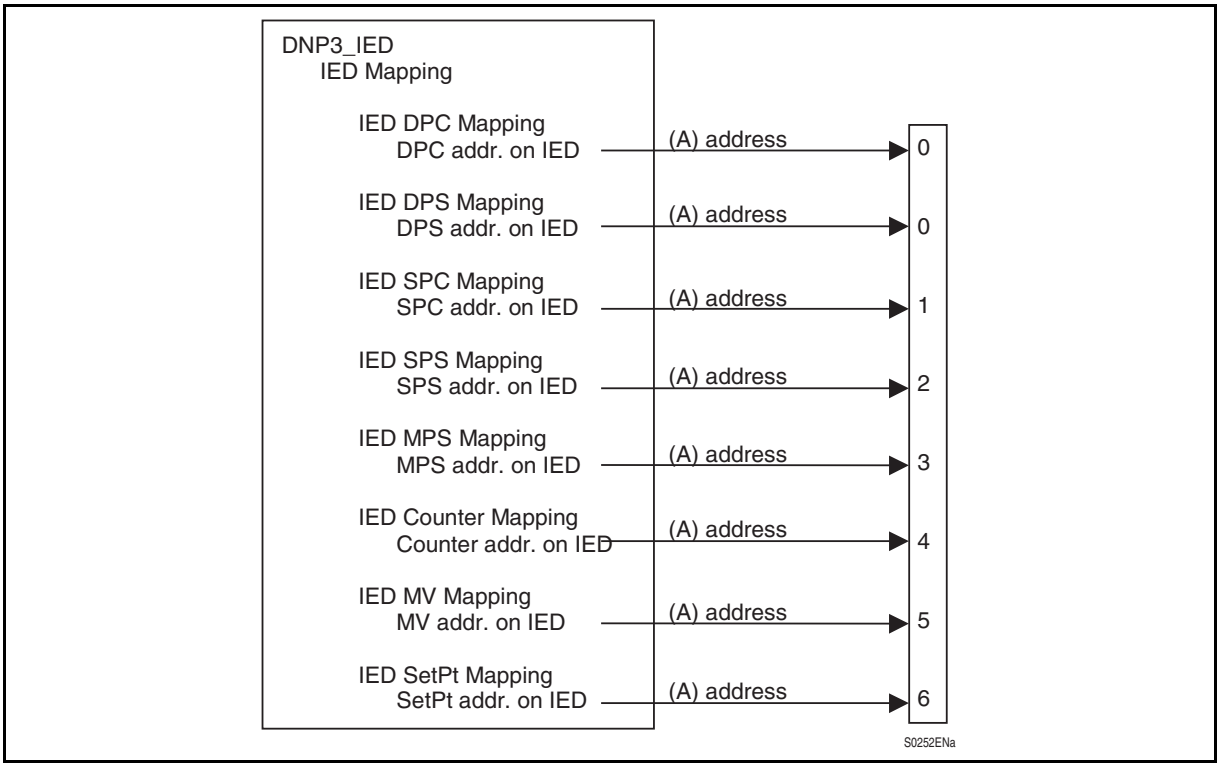
02003 / CapacityLimits / The count of IED acquisition type components is not valid (count, maximum)-> [11, 10]

2.4.6.2 IED Mapping

2.4.6.2.1 Case of DNP3 IED

In the IED Mapping, the address identification of each "xxx addr. on IED" must be unique.

The address identification is the value of the attribute "address" of the "xxx addr. on IED".



18037 / xxxAddressOnIED / The address of the 'xxx address on IED' is not unique in the Mapping

Examples:

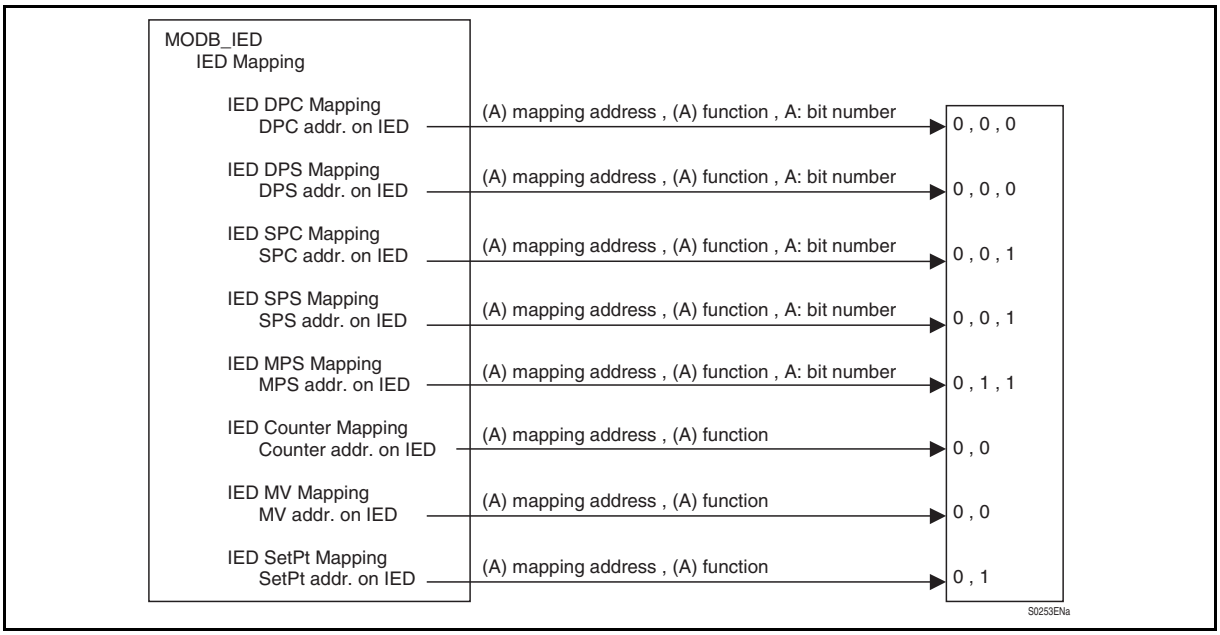
18037 /xxxAddressOnIED / The address of the 'xxx address on IED' is not unique in the Mapping-> [address, 0]

2.4.6.2.2 Case of MODBUS IED

In the IED Mapping, the address identification of each "xxx addr. on IED" must be unique.

For each "xxx addr. on IED", the address identification is made of the following combinations of its attribute values:

- { "mapping address" , "function" , "bit number" }
- { "mapping address" , "function" }


MODB_IED
IED Mapping
IED DPC Mapping
DPC addr. on IED
(A) mapping address , (A) function , A: bit number
0 , 0 , 0
IED DPS Mapping
DPS addr. on IED
(A) mapping address , (A) function , A: bit number
0 , 0 , 0
IED SPC Mapping
SPC addr. on IED
(A) mapping address , (A) function , A: bit number
0 , 0 , 1
IED SPS Mapping
SPS addr. on IED
(A) mapping address , (A) function , A: bit number
0 , 0 , 1
IED MPS Mapping
MPS addr. on IED
(A) mapping address , (A) function , A: bit number
0 , 1 , 1
IED Counter Mapping
Counter addr. on IED
(A) mapping address , (A) function
0 , 0
IED MV Mapping
MV addr. on IED
(A) mapping address , (A) function
0 , 0
IED SetPt Mapping
SetPt addr. on IED
(A) mapping address , (A) function
0 , 1
S0253ENa

18037 / xxxAddressOnIED / The address of the 'xxx address on IED' is not unique in the Mapping

Examples:

18037 / xxxAddressOnIED / The address of the 'xxx address on IED' is not unique in the Mapping-> [mapping address/function/bit number, 0/0/0]

18037 / xxxAddressOnIED / The address of the 'xxx address on IED' is not unique in the Mapping-> [mapping address/function, 0/0]

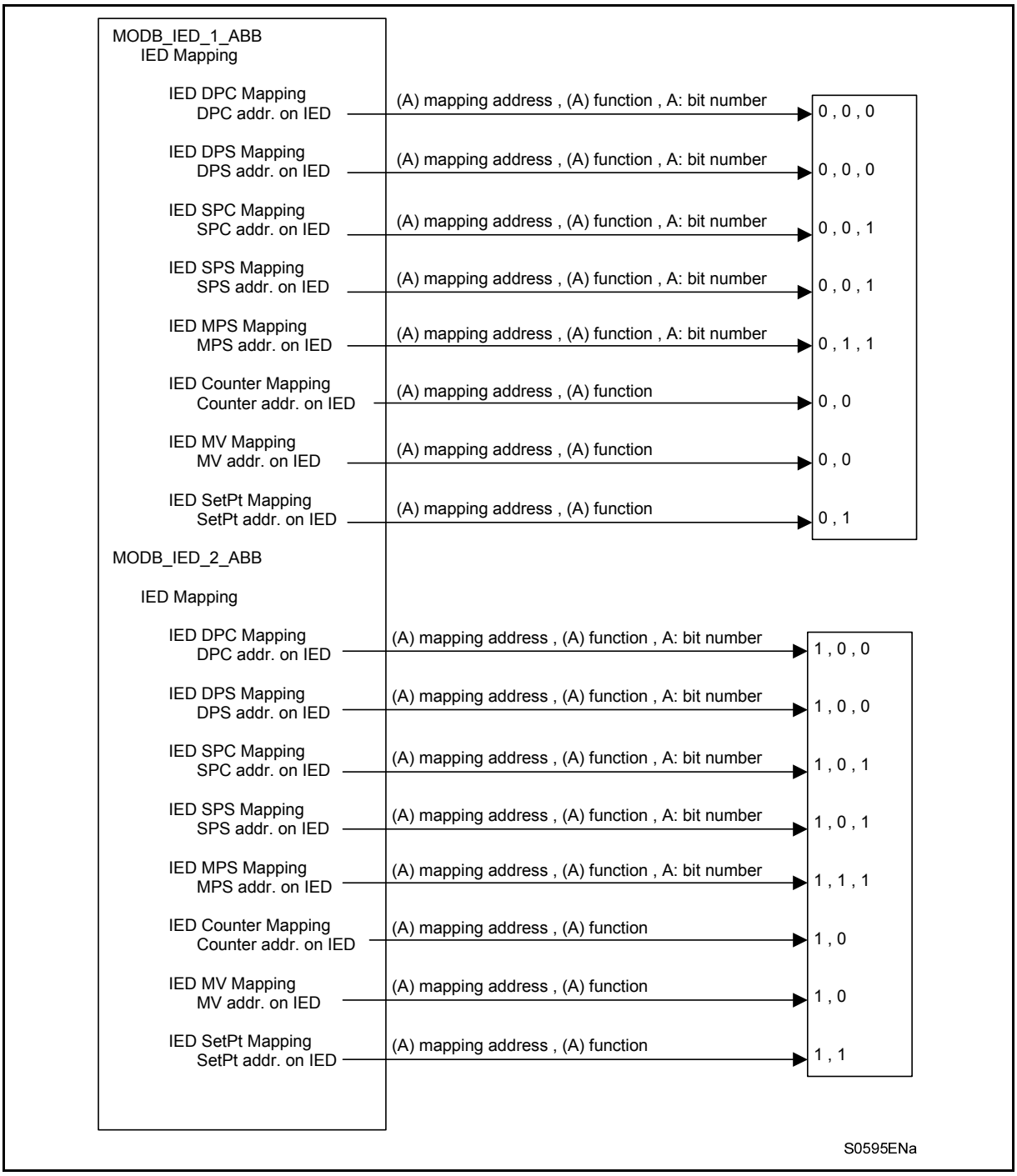
- In the IED Mapping, the address ‘bit number’ attribute must be lower than 16 (0..15) for SPS/DPS/MPS/SPC/DPC MODBUS IED Address.
- *18232 / xxxAddressOnIED / 'Bit number' on IED MODBUS address must be lower than 16*

Case of ABB Flexgate MODBUS IED

- In all of the IEDs Mappings of type ABB Flexgate, the address identification of each "xxx addr. on IED" must be unique at Legacy MODBUS level.

For each "xxx addr. on IED", the address identification is made of the following combinations of its attribute values :

- { "mapping address" , "function" , "bit number" }
- { "mapping address" , "function" }



18262 / xxxAddressOnIED / The address of the 'xxx address on IED' is not unique in the legacy MODBUS for all ABB IED-> [mapping address/fonction/bit number, 57/1/1, Scs | Ethernet network | C264 | Modbus Mod. (LB)]

Under a Legacy MODBUS a maximum of 15 ABB IED can be use. ABB flexgate manage 15 IED maximum.

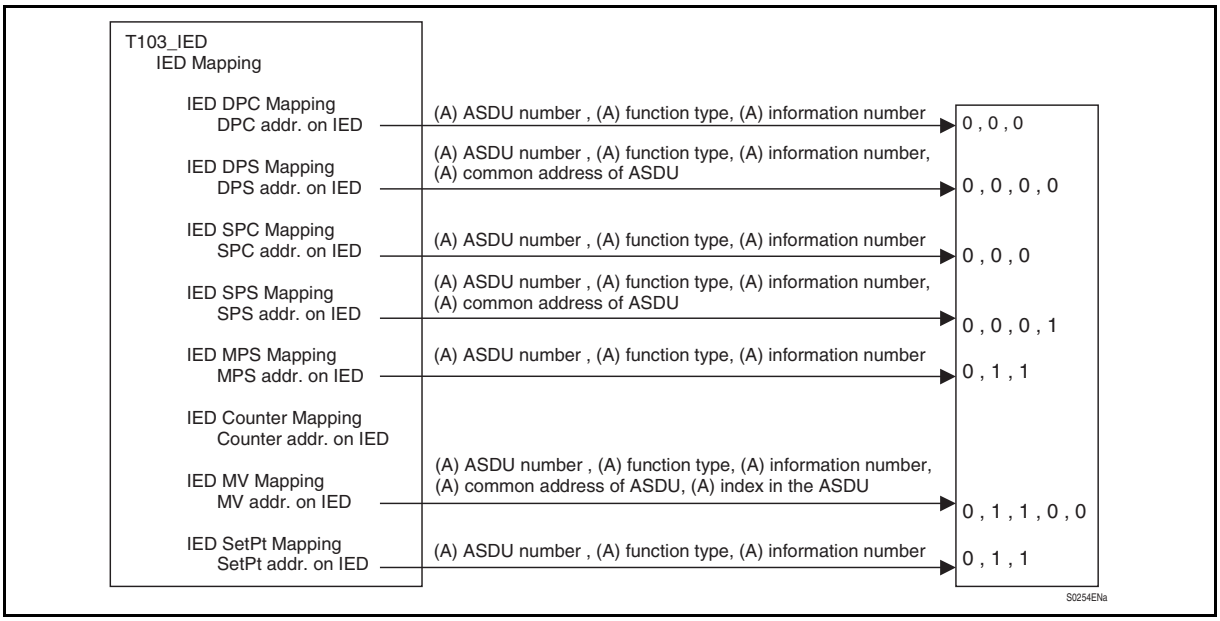
02003 / CapacityLimits / The count of ABB IED components is not valid (count, maximum)-> [16, 15]

2.4.6.2.3 Case of T103 IED

In the IED Mapping, the address identification of each "xxx addr. on IED" must be unique.

For each "xxx addr. on IED", the address identification is made of the following combinations of its attribute values:

- { "ASDU number" , "function type" , "information number" , "common address of ASDU" , "index in the ASDU" }
- { "ASDU number" , "function type" , "information number" , "common address of ASDU" }
- { "ASDU number" , "function type" , "information number" }


T103_IED
IED Mapping
IED DPC Mapping
DPC addr. on IED
(A) ASDU number , (A) function type, (A) information number
0 , 0 , 0
IED DPS Mapping
DPS addr. on IED
(A) ASDU number , (A) function type, (A) information number, (A) common address of ASDU
0 , 0 , 0 , 0
IED SPC Mapping
SPC addr. on IED
(A) ASDU number , (A) function type, (A) information number
0 , 0 , 0
IED SPS Mapping
SPS addr. on IED
(A) ASDU number , (A) function type, (A) information number, (A) common address of ASDU
0 , 0 , 0 , 1
IED MPS Mapping
MPS addr. on IED
(A) ASDU number , (A) function type, (A) information number
0 , 1 , 1
IED Counter Mapping
Counter addr. on IED
IED MV Mapping
MV addr. on IED
(A) ASDU number , (A) function type, (A) information number, (A) common address of ASDU, (A) index in the ASDU
0 , 1 , 1 , 0 , 0
IED SetPt Mapping
SetPt addr. on IED
(A) ASDU number , (A) function type, (A) information number
0 , 1 , 1
S0254ENa

18037 / xxxAddressOnIED / The address of the 'xxx address on IED' is not unique in the Mapping

Examples:

18037 / xxxAddressOnIED / The address of the 'xxx address on IED' is not unique in the Mapping-> [ASDU number/function type/information number, 0/0/0]

18037 / xxxAddressOnIED / The address of the 'xxx address on IED' is not unique in the Mapping-> [ASDU number/function type/information number/common address of ASDU, 0/0/0/1]

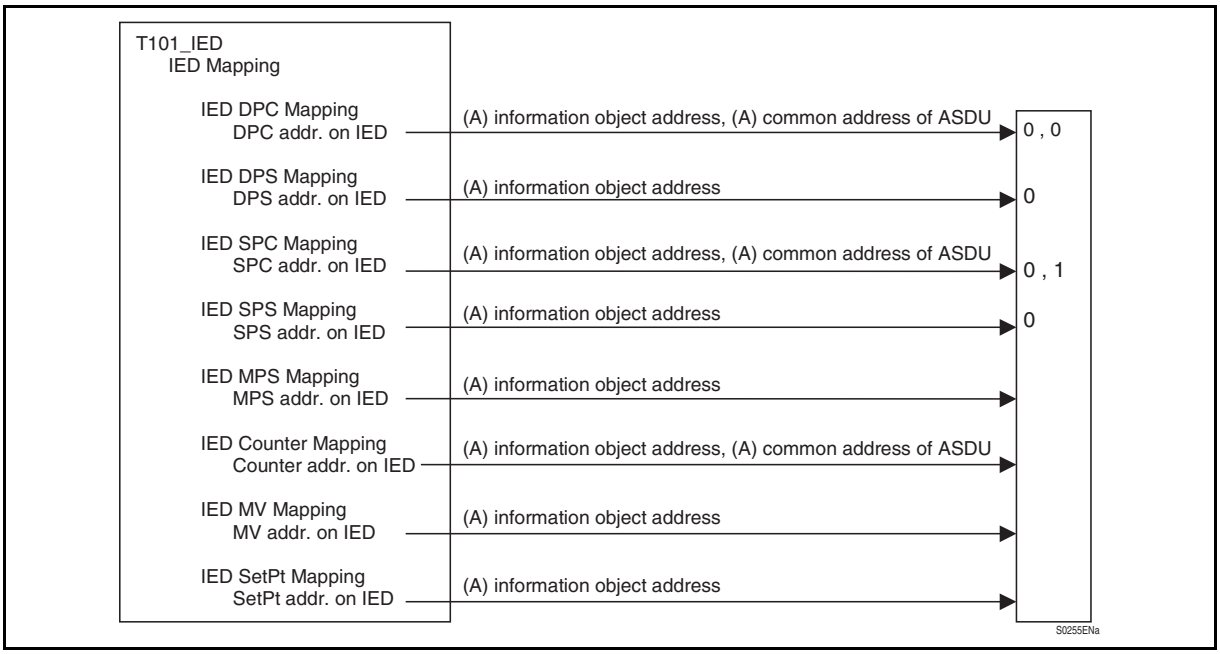
18037 / xxxAddressOnIED / The address of the 'xxx address on IED' is not unique in the Mapping-> [ASDU number/function type/information number/common address of ASDU/index in the ASDU, 0/1/1/0/0]

2.4.6.2.4 Case of T101 IED

In the IED Mapping, the address identification of each "xxx addr. on IED" must be unique.

For each "xxx addr. on IED", the address identification is made of the following combinations of its attribute values:

- { "information object address" , "common address of ASDU" }
- { "information object address" }



18037 / xxxAddressOnIED / The address of the 'xxx address on IED' is not unique in the Mapping

Examples:

18037 / xxxAddressOnIED / The address of the 'xxx address on IED' is not unique in the Mapping-> [information object address, 0]

18037 / xxxAddressOnIED / The address of the 'xxx address on IED' is not unique in the Mapping-> [information object address/common address of ASDU, 0/0]

2.4.6.3 IED on Legacy T103 Network

For each T103 IED, if the MPS datapoint POC exists, the MPS PSE must also exist.

17167 / LegacyIED / The MPS datapoint PSE is missing

For each T103 IED, if MPS datapoints POC or PSE exists, and one of them is SBMC dependent, the relation “is relay of” must exists on IED.

- 17186 / LegacyIED / The IED must have the relation Is Relay Of, because PSE and/or POC is SBMC dependent

2.4.6.4 IED on Legacy MODBUS Network

Under a Legacy MODBUS a maximum of 15 ABB IED can be use. ABB flexgate manage 15 IED maximum.

- 02003 / CapacityLimits / The count of ABB IED components is not valid (count, maximum)-> [16, 15]

For any IED under a Modbus network, the associated IED acq type imposes its synchronisation defined at network level.

17273 / LegacyIED / The IED requires a Schneider Electric synchronisation (IED network, IED)

17274 / LegacyIED / The IED requires a SEPAM synchronisation (IED network, IED)

17275 / LegacyIED / The IED requires a FLEXGATE synchronisation (IED network, IED)

2.4.7 SCADA Networks

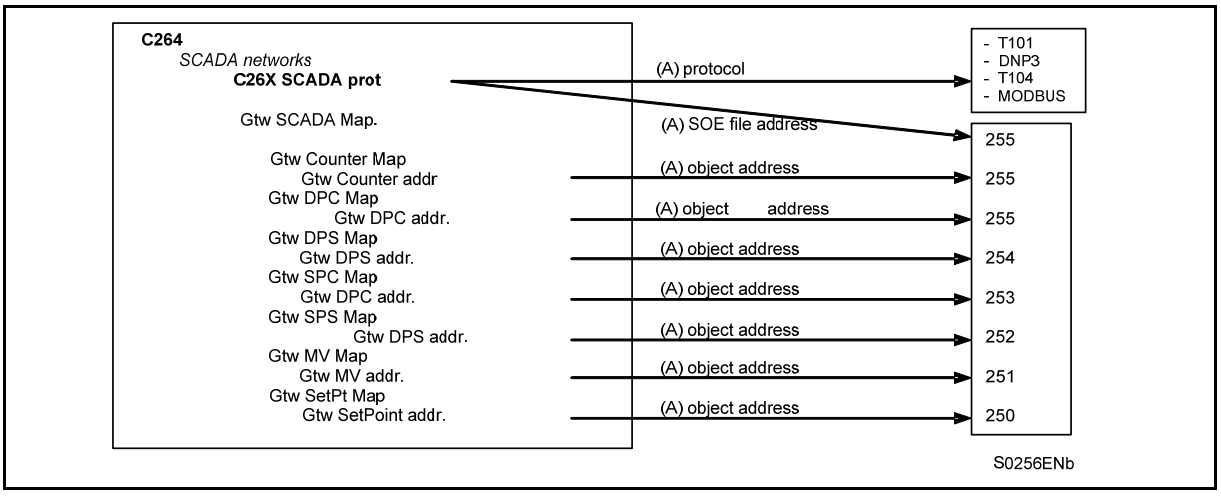
NOTE: These checks are not processed for SCADA Networks of backup devices.

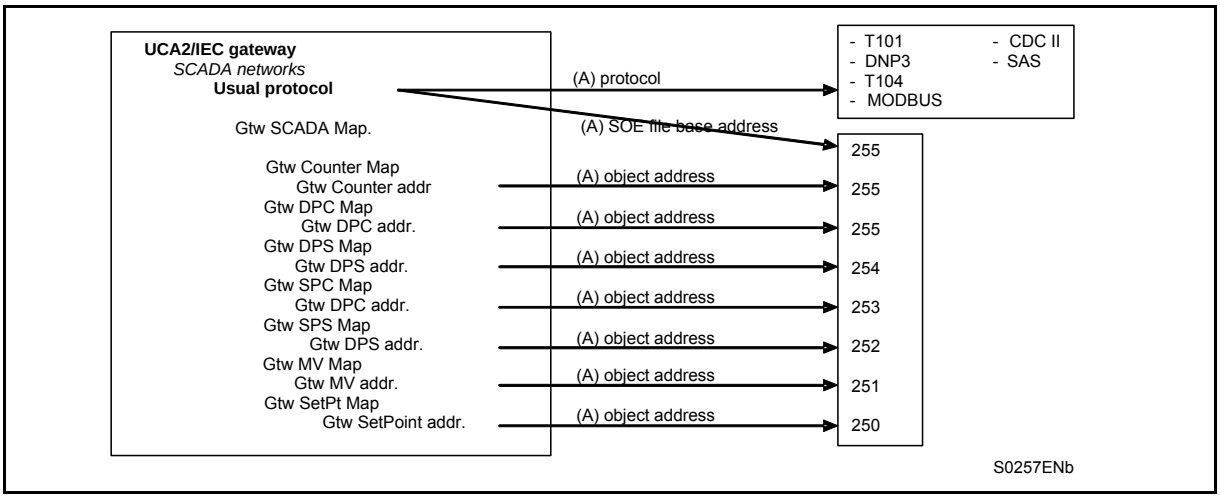
2.4.7.1 SCADA Mapping

SCADA Mappings are defined for SCADA networks of Computer and Gateway physical devices.

NOTE: the following checks, except the check of feedback addresses, do not process GI74 protocol.

2.4.7.1.1 Address value, in SCADA Mapping of C264s and Gateways





An address identification is the value of the attribute "object address" of a "Gtw xxx addr.", plus the value of the attribute "SOE file address" defined on the protocol.

In a SCADA Mapping, the address identification of each "Gtw xxx addr." must be unique.

Particular case of a "Gtw DPS addr." in DNP3 protocol of MiCOMC264:

Two addresses are used. Their values are given by:

- the attribute "object address" value
- the attribute "object address" value + 1 (reserved address).

Particular case of "Gtw DPS addr." in MODBUS protocol of MiCOM C264:

If ‘Double address usage’ value is ‘Yes’

Two addresses are used :

- open state address
- closed state address

This couple of address must be unique in SCADA mapping

19038 / xxxAddressOnSCADANetwork / The address of the 'Gtw xxx address' is not unique in the Mapping

If ‘Double address usage’ value is ‘Yes’ attribute ‘open state address’ and ‘closed state address’ must be different on each ‘Gtw DPS addr’

19247 / xxxAddressOnSCADANetwork / Attribute 'open state address' and 'Closed state address' must be different for double addressing configuration

For CDCII SCADA addresses, the address structure depends on datapoint kind:

- for SPS and DPS in static mode: CHN.SQN.OFF (concatenation of 3 attributes)
- for SPS and DPS in event mode: CHN.PPU.EVT (concatenation of 3 attributes)
- for MV and counter: CHN.SQN (concatenation of 2 attributes)
- for SPC, DPC and SetPoint: CHN.SQN (concatenation of 2 attributes)
- *19038 / xxxAddressOnSCADANetwork / The address of the 'Gtw xxx address' is not unique in the Mapping*

Examples:

19038 / xxxAddressOnSCADANetwork / The address of the 'Gtw xxx address' is not unique in the Mapping-> [object address, 255]

19038 / xxxAddressOnSCADANetwork / The address of the 'Gtw xxx address' is not unique in the Mapping-> [SOE file address, 255]

Particular cases of T101, T104 and DNP3 protocols (for MiCOM C264 and Gateways):

- The unicity constraint is applicable only for addresses of the same type. Addresses of different types can have identical addresses and therefore this does not lead to an error but to a warning.
- Address for Disturbance uploading and Buffer Overflow (only for T101 and T104) to SCADA are also taken into account in the unicity check.
- The type for T101 and T104 is same as defined in SCE (SPS, DPS, SPC…) and for DNP3, is grouping simple and double (TS, TC, TM, Counter and SetPoint)

19038 / xxxAddressOnSCADANetwork / *The address of the 'Gtw xxx address' is not unique in the Mapping*

For SCADA addresses of MPS POC or PSE, the address must be bitstring.

18169 / LegacyIED / The SCADA address format for PSE/POC must be bitstring

For CDCII SCADA addressing, SQN value attribute must respect following constraints:

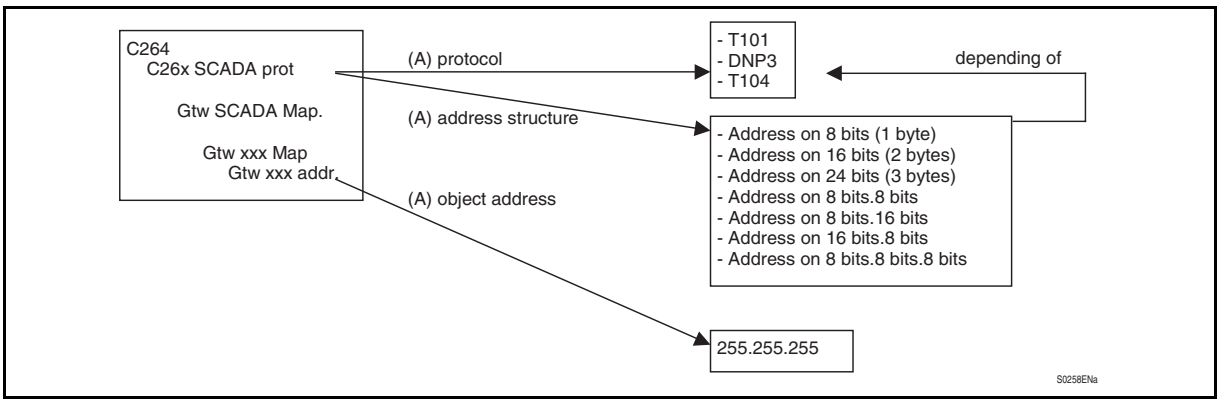
- for SPS and DPS: 0<= SQN <=63
- for MV: 130<= SQN <=255
- for Counter: 64<= SQN <=95
- for SPC and DPC: 0<= SQN <=63
- for SetPoint: 0<= SQN <=15

19189 / xxxAddressOnSCADANetwork /Bad value for SQN attribute of CDCII address (value, min max)

For T101-SAS protocol, the TC addresses are not allowed

19253 / xxxAddressOnSCADANetwork / For T101- SAS protocol, the Command addresses are not allowed

2.4.7.1.2 Address structure, in SCADA Mapping of Computers and Gateways



An "object address" value is formatted according to the "address structure" value selected in the protocol definition.

The set of possible "address structure" values depends on the protocol type.

Exception: for the DNP3 protocol type, the "address structure" is a fixed format: 16 bits in the range [1..65535].

The "object address" value of a "Gtw xxx addr." must be compatible with the value selected for the "address structure".

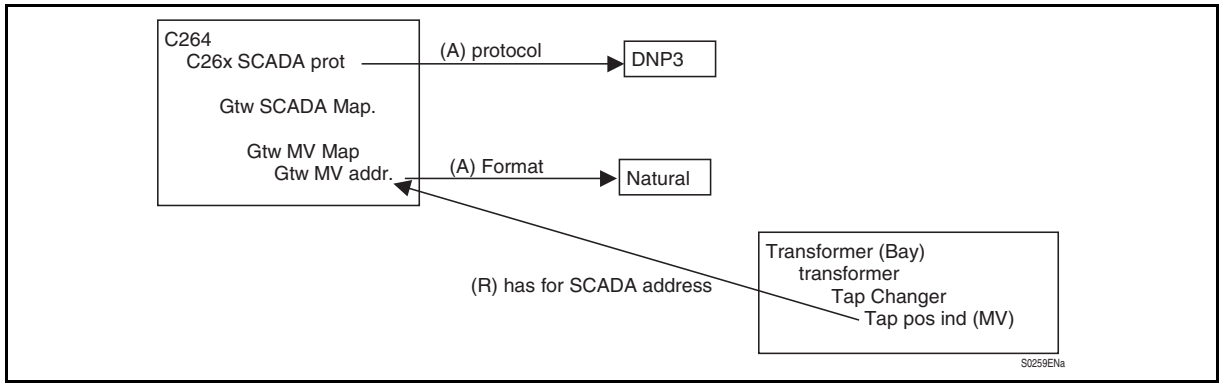
19039 / xxxAddressOnSCADANetwork / The address is incompatible with the address structure of the protocol

Examples:

19039 / xxxAddressOnSCADANetwork / The address is incompatible with the address structure of the protocol (Address on 8 bits.8 bits.8 bits)-> [object address, 255]

2.4.7.1.3 MV Address format on DNP3 protocol, of Computers and Gateways

On a DNP3 protocol, a "Gtw MV addr.", which is the SCADA address of a "Tap pos ind" datapoint, must have its "Format" attribute set to the "Natural" value.



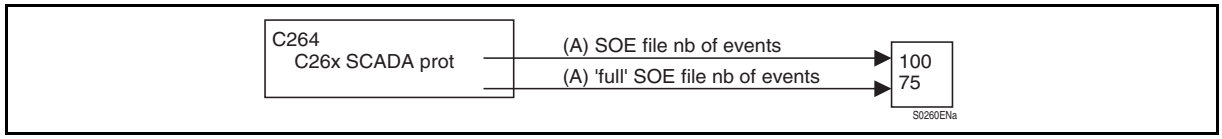
19123 / xxxAddressOnSCADANetwork / The attribute value is not compatible with the relation

Examples:

19123 / xxxAddressOnSCADANetwork / The attribute value is not compatible with the relation-> [Format = Adjusted, is SCADA address of: Tap pos ind]

2.4.7.1.4 SOE file attributes, in SCADA Mapping of Computers

These attributes are defined for a Computer SCADA protocol.



The following constraints between the attributes must be respected:

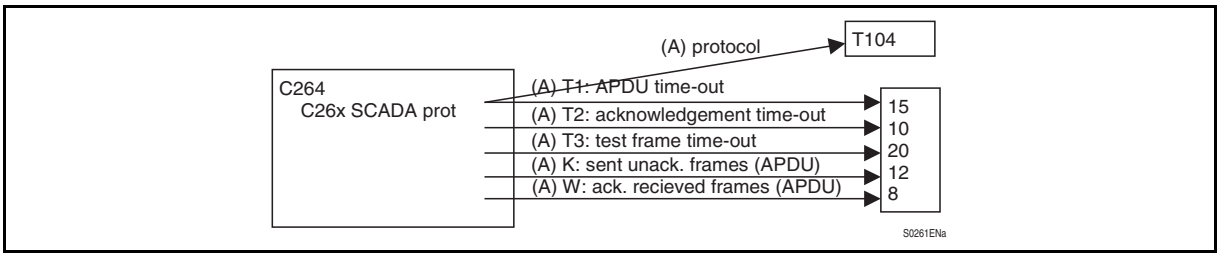
"SOE file nb of events" > "'full' SOE file nb of events"

20103 / SCADA_Networks / 'full' SOE file nb of events is not lower than SOE file nb of events

Examples:

20103 / SCADA_Networks / 'full' SOE file nb of events is not lower than SOE file nb of events-> [175, 100]

2.4.7.1.5 T104 protocol attributes, of Computers and Gateways



The following constraints between the attributes must be respected:

"T2" < "T1"

"T3" > "T1"

"W" ≤ "K"

20103 / SCADA_Networks / T2: acknowledgement time-out (s) is not lower than T1: APDU time-out (s)

20103 / SCADA_Networks / T1: APDU time-out (s) is not lower than T3: test frame time-out (s)

20102 / SCADA_Networks / W: ack. received frames (APDU) is greater than K: sent unack. frames (APDU)

Examples:

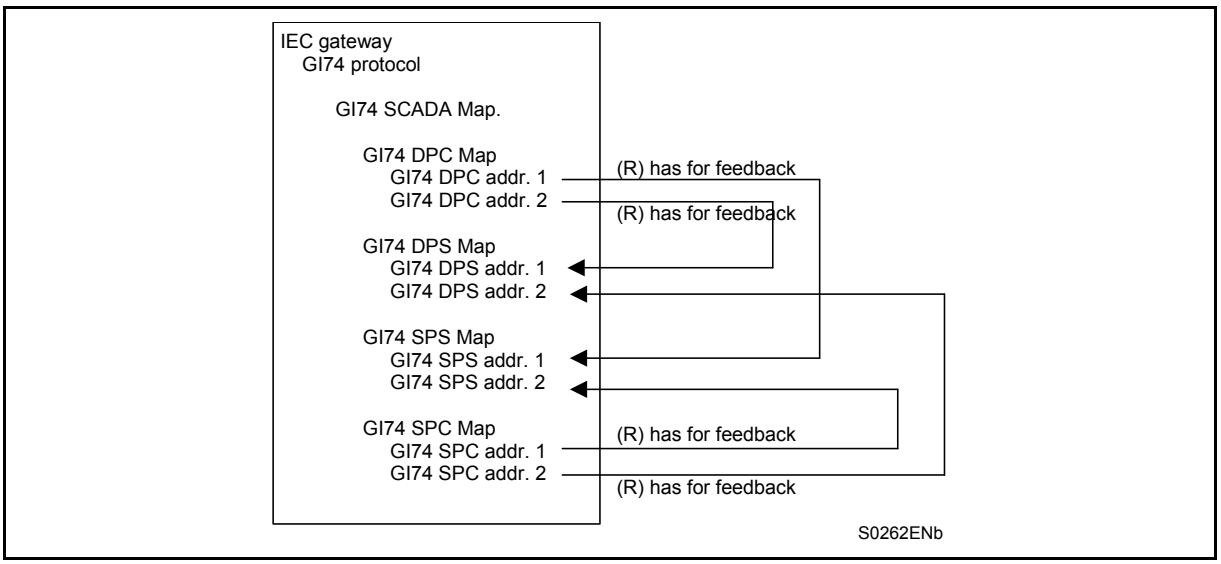
20103 / SCADA_Networks / T2: acknowledgement time-out (s) is not lower than T1: APDU time-out (s)-> [20, 15]

20103 / SCADA_Networks / T1: APDU time-out (s) is not lower than T3: test frame time-out (s)-> [15, 14]

20102 / SCADA_Networks / W: ack. received frames (APDU) is greater than K: sent unack. frames (APDU)-> [12, 11]

2.4.7.1.6 Feedback addresses on GI74 protocol, of Gateways

A "GI74 DPC addr." (or a "GI74 SPC addr.") must have **1**, and only 1, link to a "GI74 DPS addr." or "GI74 SPS addr." feedback address.



14022 / RelationHasForFeedback / The link to feedback is missing

14023 / RelationHasForFeedback / Multiple links to feedbacks

Example:

14023 / RelationHasForFeedback / Multiple links to feedbacks-> [has for feedback: GI74 DPS addr., has for feedback: GI74 SPS addr.]

2.4.7.1.7 Addressing of MPS on T101/T104 of MiCOM C264

MPS addressing in refused on T101/T104 SCADA network of MiCOM C264.

19255 / xxxAddressOnSCADANetwork / MPS addressing refused on C264 T101/104 SCADA network

2.4.7.2 Number of SCADA networks

On a MiCOM C264,, up to four SCADA networks can be created. When more than two exists, MiCOM C264, must be based on CPU3 hardware.

20206 / SCADA_Networks / The maximum number of SCADA protocols for a C264 *has been reached (max number, count of protocols)*

20207 / SCADA_Networks / The number of SCADA protocols required a C264*based on CPU3 hardware (max number, count of protocols)*

Only one of these two checks appear on SCE at a same time.

On a MiCOM C264 only one DNP3 SCADA NETWORK on IP can be configured.

20272 / SCADA_Networks / The maximum number of SCADA protocol DNP3 configured on IP for a C264 has been reached (max number, count of protocols)

2.4.7.2.1 Management on CPU3 Ethernet port

The two CPU3 Ethernet ports can be configured as follows:

N°	Port 1	Port 2	Comments
1	IEC61850 SBUS + SCADA IP 1	SCADA IP 2	2 independent SCADA protocols with different database
2	SCADA IP 1	SCADA IP 2	2 independent SCADA protocols with different database
3	IEC61850 SBUS	SCADA IP	

IEC 61850 Station Bus, if configured, is always on port 1.

One or two IP SCADA protocols can be configured on port 1 and/or 2.

The existing IS SCADA protocols are DNP3 and T104. DNP3 is mono-client. T104 is multi-clients (up to 4 clients) with only one active at one time. One protocol is binded on one (and only one) Ethernet port.

2.4.7.3 Protocol type coherency with hardware port type

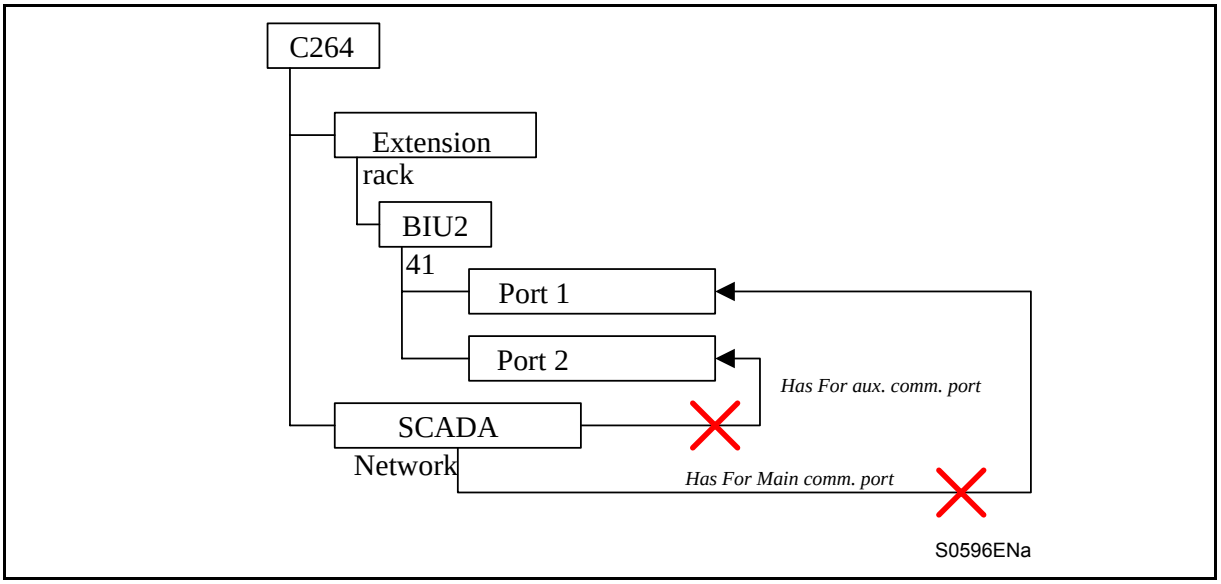
Coherency must exist between the protocol type and the hardware port type according the following table

Prot type (Hardware port)	Protocol type (SCADA networks)	Coherency
Usual protocol	T101, T104, DNP3, MODBUS, CDCType II	OK
GI74 protocol	GI74	OK
V35 ACKSYS-MCX	T101	OK

20209 / SCADA_Networks / The coherency between this protocol type (protocol type) and this gateway port (gateway port) is failed.

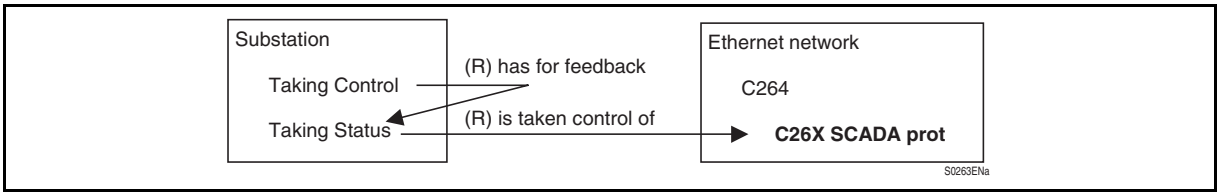
2.4.7.4 Communication port of a SCADA Network

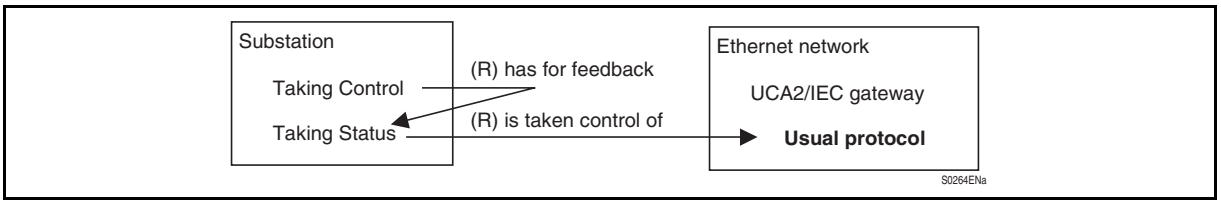
A SCADA network can't use a communication port of an extension rack.

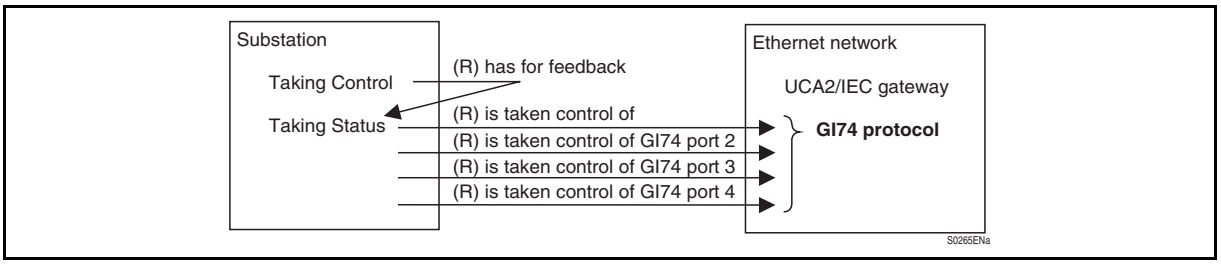


20303 / SCADA_Networks / Scada Network can't use a communication port of an extension rack

2.4.8 Taking Control function







- If, at least, one SCADA network is linked to a Taking Control function, all the SCADA Networks of the system must be linked to a Taking Control function.

52131 / TakingControl / The relation link is missing-> [has for taken control]

- If a "Taking Status" datapoint is linked to a SCADA Network, it must also be linked to a "Taking Control" datapoint through the relation "has for feedback".

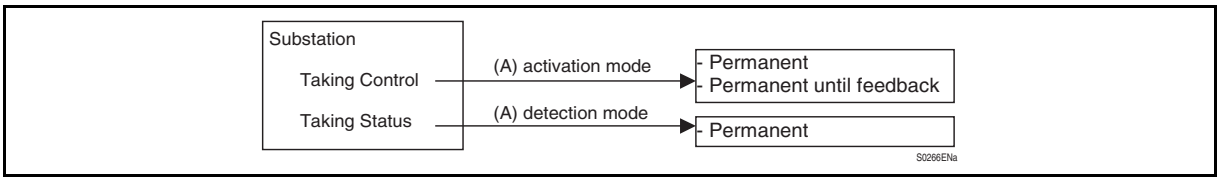
52131 / TakingControl / The relation link is missing-> [is feedback of]

- A "Taking Control" datapoint must be linked to a "Taking Status" datapoint through the relation "has for feedback".

14022 / RelationHasForFeedback / The link to feedback is missing

- The "Taking Control" datapoint must have its "activation mode" attribute set to a "Permanent…" value.

The "Taking Status" datapoint must have its "detection mode" attribute set to the "Permanent" value.



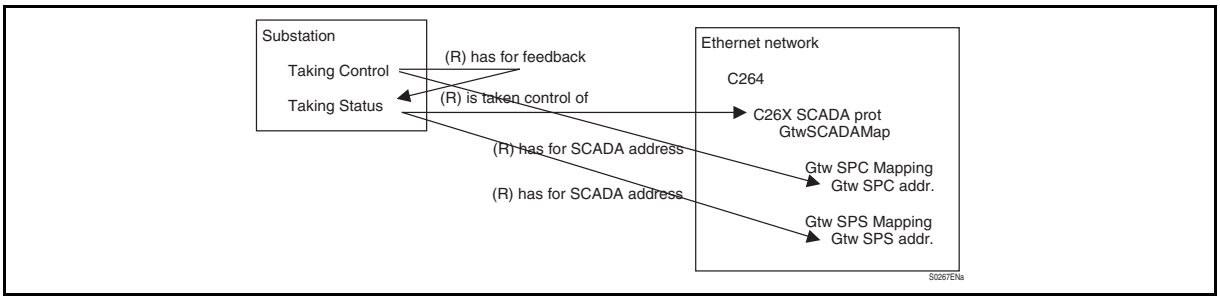
52101 / TakingControl / The attribute value is not valid

Examples:

52101 / TakingControl / The attribute value is not valid-> [activation mode, Transient]

52101 / TakingControl / The attribute value is not valid-> [detection mode, Transient]

- Both "Taking Control" and "Taking Status" datapoints must be linked to a SCADA address in the mapping of their SCADA network.

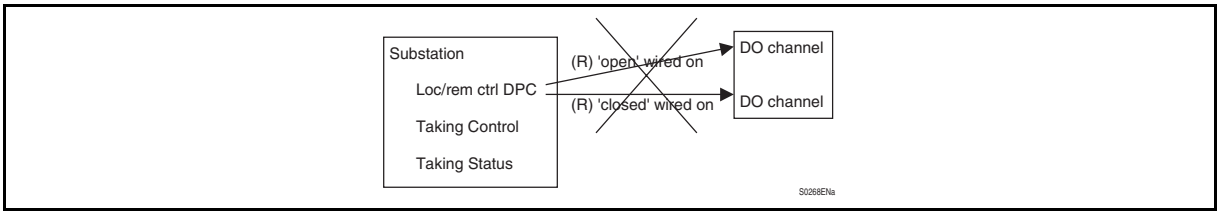


52133 / TakingControl / The datapoint is not linked to a SCADA address

Example:

52133 / TakingControl / The datapoint is not linked to a SCADA address of Scs | Ethernet network | C264 | C26X SCADA prot

- If the Taking Control function is defined in the system, the substation "Loc/rem ctrl DPC" datapoint must be present and not wired.



52089 / TakingControl / The datapoint is missing-> [Loc/rem ctrl DPC]

52100 / TakingControl / The datapoint is wired

2.4.9 Non PACiS IED on IEC61850

2.4.9.1 Virtual input of IEC61850 IED

Any virtual input and its associated used datapoint can not have the same server, that is to say the IEC61850 containing the virtual input.

82283 / IED virtual input / The virtual input and the associated used datapoint can not have the same server

2.4.9.2 Report by client limit

For each non PACiS IED, check if there's enough report for all clients needs.

83284 / Indiced reports Not enough reports for all clients (Server path, Client path, List of DataObject missing)

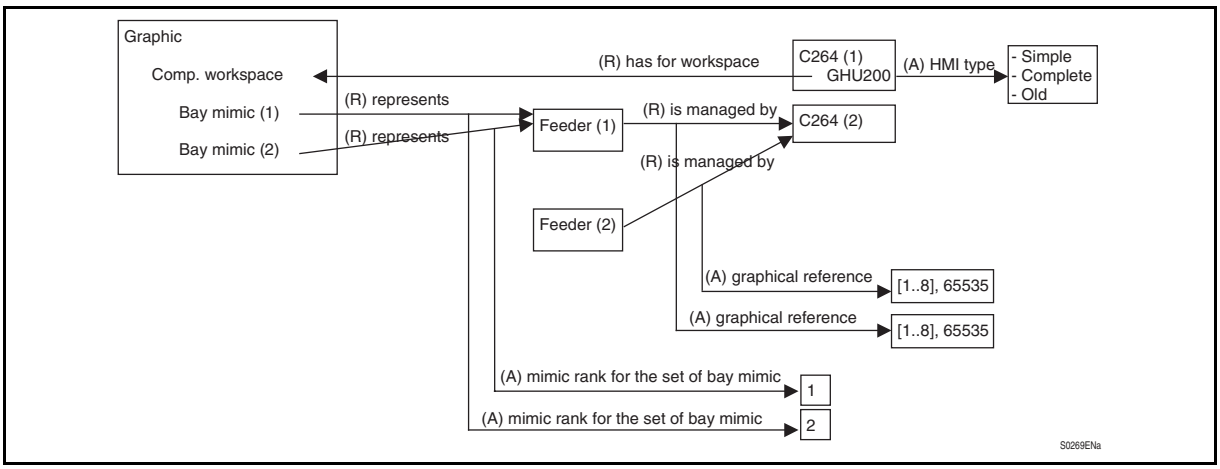
2.4.9.3 Dataset creation limit

For each non PACiS IED, check if all needed datasets may be created (regarding capability of the IED).

83285 / Indiced reports / Number of DataSet to create for this IED is greater than the maximum number allowed (Server path, max number of DataSet allowed, dataSet number to create)

2.5 Electrical checks

2.5.1 Bay and Bay Mimic



- The computer ("C264 (2)") managing a bay ("Feeder (1)") represented by a "Bay mimic" must be the same as the one linked to the "Comp. workspace" ("C264 (1)") of this "Bay mimic".

33076 / BayMimic / The BayMimic and its Workspace are not linked to the same computer

Example:

33076 / BayMimic / The BayMimic and its Workspace are not linked to the same computer-> [Scs | Ethernet network | C264, Scs | Ethernet network | C264]

- A bay ("Feeder (1)") can be represented by 0, 1 or 2 "Bay mimic". Each "represents" relation has an attribute "mimic rank for the set of bay mimic". In the case of 2 relations, each attribute value must be unique.

33106 / BayMimic / The relation attribute value is not unique (relation, attribute)

Example:

33106 / BayMimic / The relation attribute value is not unique (relation, attribute)-> [is represented by: Bay mimic, mimic rank for the set of bay mimic, 1]

- For a Computer, the maximum count of managed bays (relation "is managed by") which are linked to a "Bay mimic" (relation "represents"), is **12**.

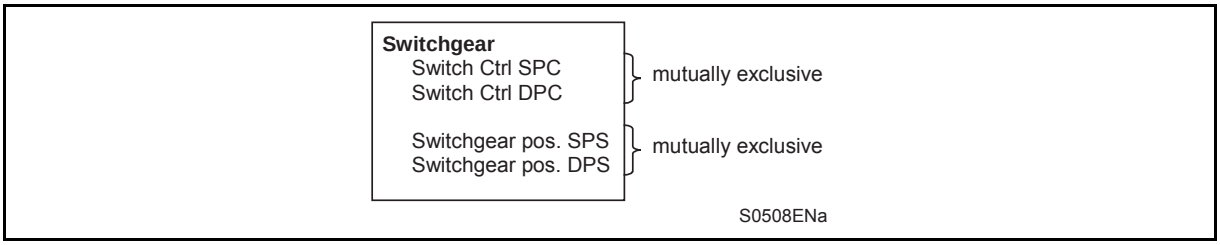
This check is performed only if the Computer GHU200 board has its attribute "HMI type" set to the "Complete" value.

33005 / BayMimic / The count of graphically displayed Bays is not valid (count, maximum)

Example (from the Computer point of view):

33005 / BayMimic / The count of graphically displayed Bays is not valid (count, maximum)-> [13, 12]

2.5.2 Switchgear

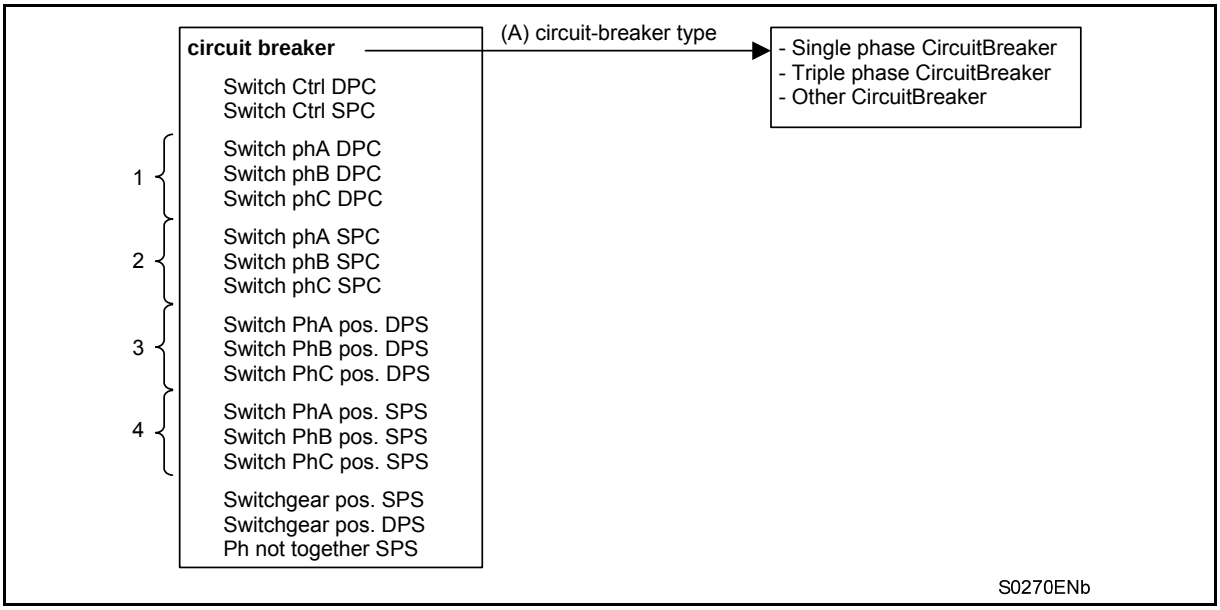


The same type of datapoints which can be single or double (like "Switch Ctrl DPC" and "Switch Ctrl SPC") are mutually exclusive

70066 / Switchgear / The datapoints are not compatible -> [Switch Ctrl SPC, Switch Ctrl DPC]

2.5.3 Circuit Breaker

2.5.3.1 Phases of Circuit Breaker



- The same type of datapoints which can be single or double (like "Switch Ctrl DPC" and "Switch Ctrl SPC") are mutually exclusive. None is mandatory.

40066 / CircuitBreaker / The datapoints are not compatible-> [Switch Ctrl DPC, Switch Ctrl SPC]

- If the "circuit-breaker type" is set to the "Single phase CircuitBreaker" value, then:
  - in a set, if one Datapoint is present for a phase, then the two others must be present as well.
  - the Datapoints of the two sets (1) and (2) are mutually exclusive.
  - the Datapoints of the two sets (3) and (4) are mutually exclusive.
  - if the Datapoint "Switchgear pos." is present, but none of the three Datapoints "Switch PhA pos", "Switch PhB pos", and "Switch PhC pos" then the SPS Datapoint "Ph not together" is mandatory.

40093 / CircuitBreaker / The datapoints set is not complete for the phases A,B,C-> [Switch phA DPC]

40092 / CircuitBreaker / The datapoint sets are incompatible-> [(Switch phA DPC,Switch phB DPC,Switch phC DPC) , (Switch phA SPC,Switch phB SPC,Switch PhC SPC)]

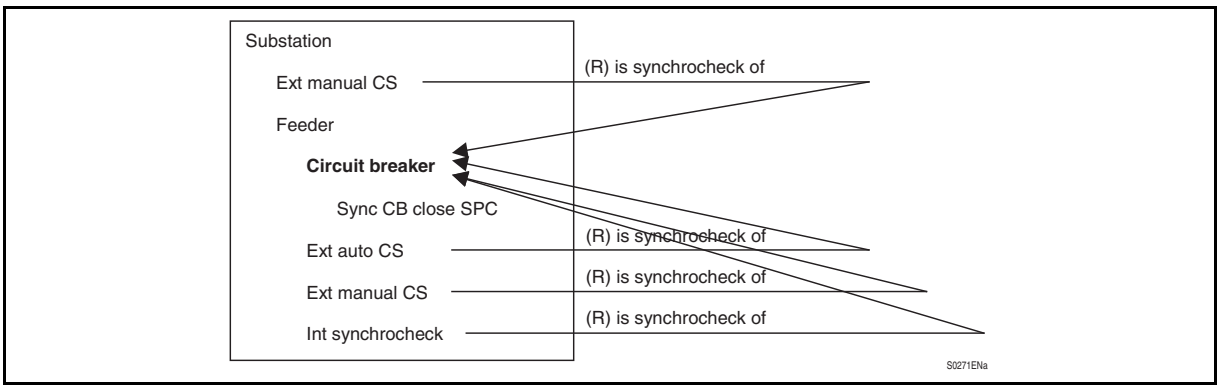
40092 / CircuitBreaker / The datapoint sets are incompatible-> [(Switch phA DPS,Switch phB DPS,Switch phC DPS) , (Switch phA SPS,Switch phB SPS,Switch PhC SPS)]

40089 / CircuitBreaker / The datapoint is missing-> [Ph not together]

- If the "circuit-breaker type" is set to the "Triple phase CircuitBreaker" value, then:
  - none of the datapoints referencing a phase (phA, phB or phC) is allowed.

40094 / CircuitBreaker / The datapoint is not allowed-> [Switch phA DPC]

2.5.3.2 Synchrocheck of Circuit Breaker



- The Circuit Breaker must be linked only once to a Synchrocheck function (relation "is synchrocheck of").

42098 / Synchrocheck / Multiple links to synchrochecks

Example:

42098 / Synchrocheck/Multiple links to synchrochecks-> [has for synchrocheck: Ext auto CS]

- If the Circuit Breaker is linked to a Synchrocheck function (relation "is synchrocheck of"), then its "Sync CB close" SPC Datapoint must be present.

42094 / Synchrocheck / The datapoint is not allowed-> [Site | Substation | Voltage level | BAY_CBO | circuit breaker | Sync CB close]

- If the Circuit Breaker is linked to a internal automatic Synchrocheck function (relation "is synchrocheck of"), then its "Sync CB close" SPC Datapoint must not have a feedback xPS.

42049 / Synchrocheck / The relation is not valid-> [Site | Substation | Voltage level | BAY_CBO | circuit breaker | Sync CB close | has for feedback : Switchgear pos.]

- If the Circuit Breaker is linked to external Synchrocheck or internal auto synchrocheck function (relation "is synchrocheck of"), then its "Sync CB close" SPC Datapoint must be present.

In case of Internal Manual Synchrocheck this datapoint is optional.

42089 / Synchrocheck / The datapoint is missing-> [Sync CB close]

- if a circuit-breaker has got a xPC "Sync CB Close" managed by a "CtrlPopup", then a datapoint “Switch Ctrl xPC” must exist under the breaker and be managed by this "CtrlPopup".

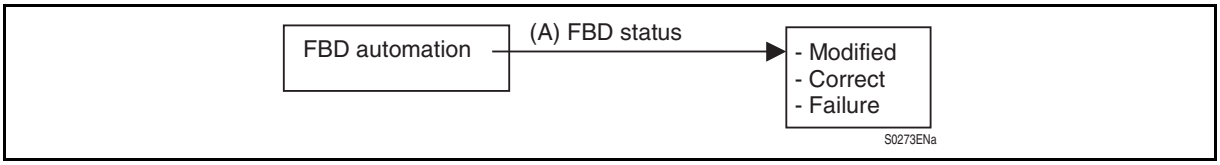
42156 / Synchrocheck / The datapoint is missing (popup usage) -> [Switch Ctrl xPC]

47157 / Symbol / The ctrl popup must act on the following datapoint -> [Switch Ctrl xPC]

2.5.4 Automation Input/Output Plugs

2.5.4.1 FBD automation

2.5.4.1.1 FBD status



- The value of the attribute "FBD status" must be "Correct".

38101 / Automation / The attribute value is not valid

Example:

38101 / Automation / The attribute value is not valid-> [FBD status, Modified]

- The developed equation can’t contain more than 256 datapoints.

38160 / Automation / The developed equation is to big (do not exceed 256 datapoints)

- A computer mustn’t manage more than 200 FBD/interlocks

38288 / Automation / Too much FBD/Interlock for a computer (count, max)

- FBD must not contain TON/TOFF block with a timer value lower than t#50ms.

38252 / Automation / FBD contains at least one timer value lower than 50 milliseconds (lower value)

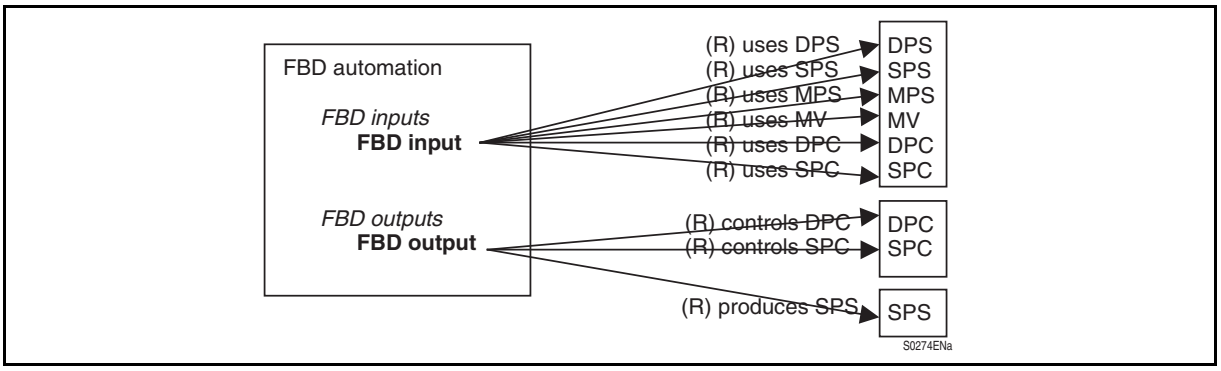
- A computer must not manage more than 12 accurate timers of FBD

38307 / Automation / Too much accurate timer of FBD for a computer (count, max)

- FBD must not contain TON_A/TOFF_A accurate block timer with a timer value greater than t#50ms

38315 / Automation / FBD contains at least one accurate timer value greater than 50 milliseconds (value)

2.5.4.1.2 Input/Output plugs



- For one "FBD input" plug, only one relation is allowed.

39088 / AutomationIOPlug / Multiple links to datapoints

Example:

39088 / AutomationIOPlug / Multiple links to datapoints-> [uses DPS: Bay DPS]

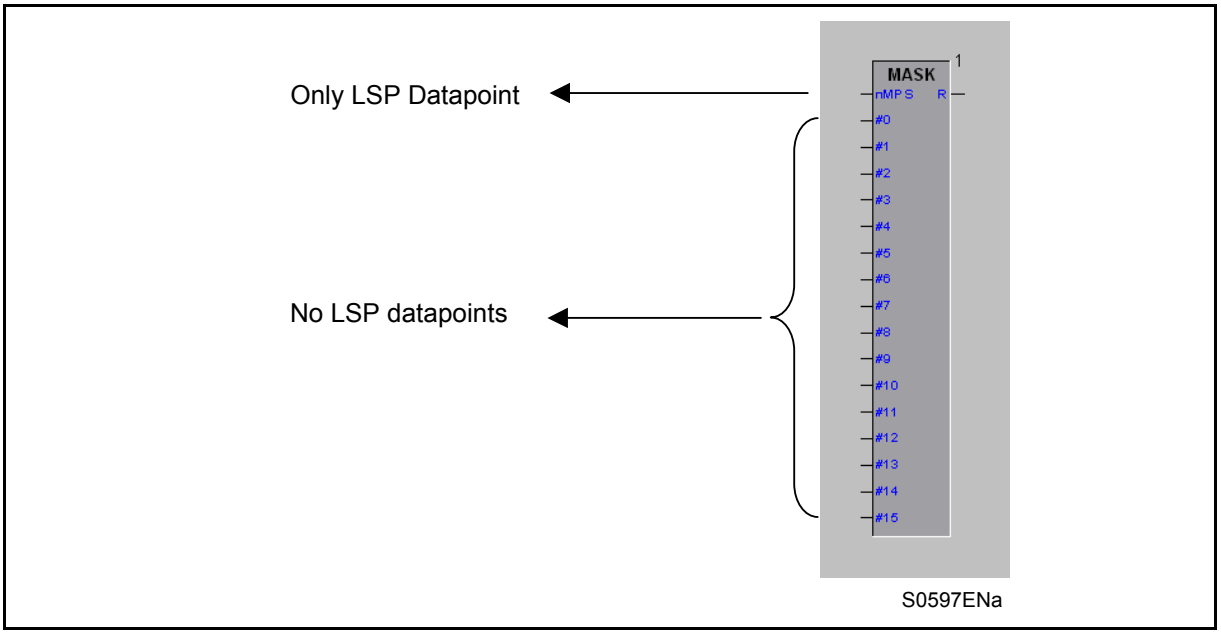
- For one "FBD output" plug:
  - the count of relations towards DPC or SPC Datapoints must be ≤ **4**
  - the count of relations towards SPS Datapoints must be ≤ **4**
  - a SPC/DPC datapoint can not be linked more than once to the same FBD output

39088 / AutomationIOPlug / Multiple links to datapoints

Example:

39088 / AutomationIOPlug / Multiple links to datapoints-> [controls DPC: Bay DPC]

- Any input or output of FBD automatism that is not served by the computer managing the FBD, must have ‘goose usage’ attribute set to ‘true’ at data object level of the associated datapoint.
- Bloc MASK accepts only LSP datapoint on entry “nMPS”. (Error 39219)
- FBD bloc MASK doesn’t accept LSP datapoint on “bit” entry (0 to 15) (Error 39220)



39219 / AutomationIOPlug / Fbd Mask nMPS entry must be direct-link with LSP (Uses data point)

Example:

39219 / AutomationIOPlug / Fbd Mask nMPS entry must be direct-link with LSP (Uses data point)-> [Site | Substation | Voltage level | Generic bay | Generic module | Module MPS]

39220 / AutomationIOPlug / Fbd Mask bit entry must not be link with LSP (Uses data point) *(Uses data point)*

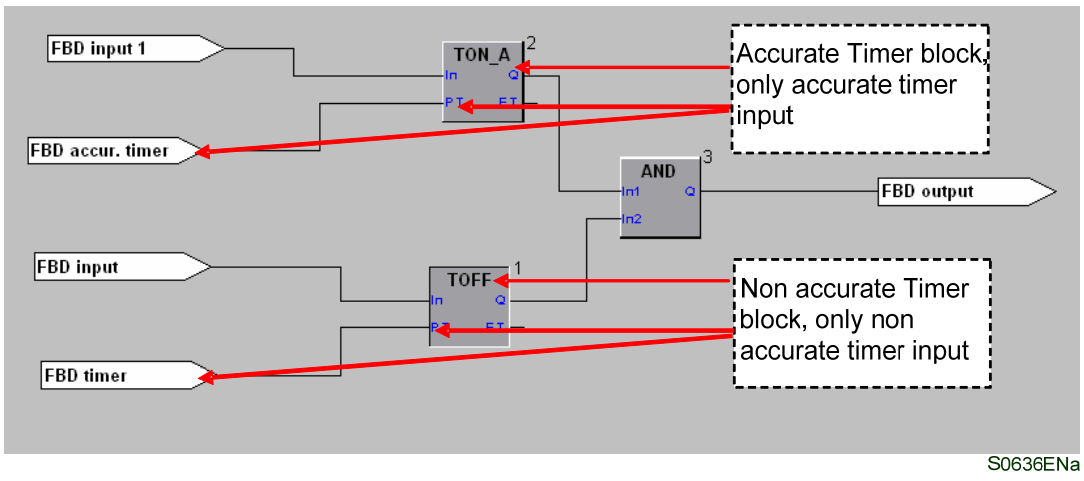
Example:

39220 / AutomationIOPlug / Fbd Mask bit entry must not be link with LSP (Uses data point)-> [Site | Substation | Voltage level | Generic bay | Generic module | LSP]

- Any Fbd Input/Output must be linked with at least one data point.

39226 / AutomationIOPlug / Fbd input/output must be linked with one data point.

- For FBD, two types of timer exists non accurate timer and accurate timer, this block allow one setting timer as input (PT input). The Timer block non accurate allow only Setting timer as input, and the accurate timer allow only Setting timer accurate as input.



- Any FBD automatism input or output, which is not served by the computer, must have a ‘goose usage’ attribute set to ‘true’ from data object level of datapoint associated

39308 / AutomationIOPlug / Invalid setting timer used for timer block (setting path, allowed timer setting, used timer setting)

22149 / DatapointClient / The client-server relation must be goosed for Automation/Mapping usage at client level (server, client)

22150 / DatapointClient / The IEC relevant address must be goosed for Automation/Mapping usage

- Any Fbd Input/Output must be used in the diagram

39271 / *AutomationIOPlug / The IOPlug must be used in FBD diagram*

2.5.4.1.3 FBD consistency

In some degraded cases, an FBD may be inconsistent. There's 3 possible result:

- the XML file doesn't exists
- the XML file is not correct
- the inputs/outputs or settings defined in XML file are not present in SCE database

38273 / Automation / The FBD's XML file doesn't exists -> [XML file]

38274 / Automation / The FBD's XML file is corrupt -> [XML file]

38275 / Automation / The FBD has inconsistent input, output or setting -> [XML file]

When such problem raise, the FBD is corrupted, and must be deleted.

For instance objects or template clones, the check is done on template source

2.5.4.1.4 Datapoint used by FBD at MiCOM C264 level

- At *MICOM* C264 level, a datapoint can not be used more than 255 times in the set of its PSLs.

38222 / Automation / The datapoint is used more than 255 times in the PSLs of MICOM C264 [C264, nb tims >255]

2.5.4.1.5 Settings Micom S1 used by FBD at MiCOM C264 level

- By MICOM C264, the number of Boolean settings MicomS1 used in FBD can't be greater than 100.

38253 / Automation / The number of FBD boolean settings MicomS1 for this C264 is too great [C264, nb > 100]

- By MICOM C264, the number of Timer settings MicomS1 used in FBD can't be greater than 100.

38254 / Automation / The number of FBD timer settings MicomS1 for this C264is too great [C264r, nb > 100]

- By MICOM C264, the number of settable FBD can't be greater than 50.

38269 / Automation / The number of settable FBD for this C264 is too great [C264, nb > 50]

- For each FBD operator the maximum number of boolean setting per operator basis (AND, OR …) is 1.

38293 / Automation / There are more than one boolean setting for the operator

- For each timer and accurate timer, the default value must be between the minimum value and maximum value.

38312 / Automation / The default value is not between minimum and maximum value

- For each timer and accurate timer, the default value must be a multiple of step value.
  - Example: a step of 15 allows a default value of 15, 30, 45, 60, etc…

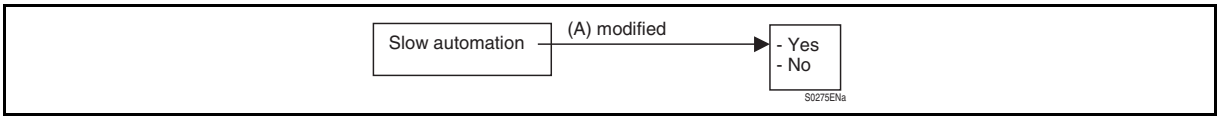
38320 / Automation / Default value for FBD timer must be a multiple of step value

- For each FBD function block (TON, TOFF, TON_A, TOFF_A and RS) it is not allowed to have a boolean setting.

38314 / Automation / The function block can not have a boolean setting as input

2.5.4.2 Slow automation

2.5.4.2.1 Modified flag



The value of the attribute "modified" must be "No".

38101 / Automation / The attribute value is not valid

Example:

38101 / Automation / The attribute value is not valid-> [modified, Yes]

2.5.4.2.2 Input/Output

Any input or output of slow automation that is not served by the computer managing the automation, must have ‘goose usage’ attribute set to ‘true’ at data object level of the associated datapoint.

22149 / DatapointClient / The client-server relation must be goosed for Automation usage at client level (server, client)

22150 / DatapointClient / The IEC relevant address must be goosed for Automation/Mapping usage.

2.5.4.2.3 Settings Micom S1 used by UserFunctions (Slow Automation) at C264 level

- By MICOM C264, the number of settings MicomS1 (Boolean, Integer, Float) used in Isagraf can’t be greater than 100.

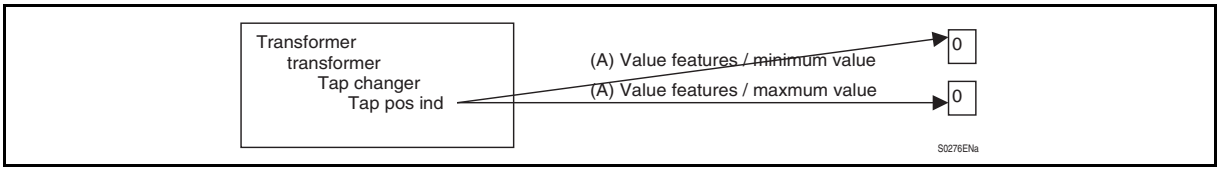
38252 / Automation / The number of Isagraf settings MicomS1 for this C264r is too great [C264, nb > 100]

- By MICOM C264, the number of settable Isagraf function can’t be greater than 50.

38268 / Automation / The number of settable Isagraf function for this C264 is too great [C264 nb > 50]

2.5.5 Tap Changer

2.5.5.1 Position indicator



The following constraint between the two attributes must be respected:

("maximum value" − "minimum value" + 1) ∈ [1..64]

37087 / TapChanger / The result of Value features/maximum value - Value features/minimum value + 1 is not in [2..64]

Moreover for analog TPI the following constraints must be respected:

- current valid range (% maximum value) > (2 / (maximum acq. value - minimum acq. value))

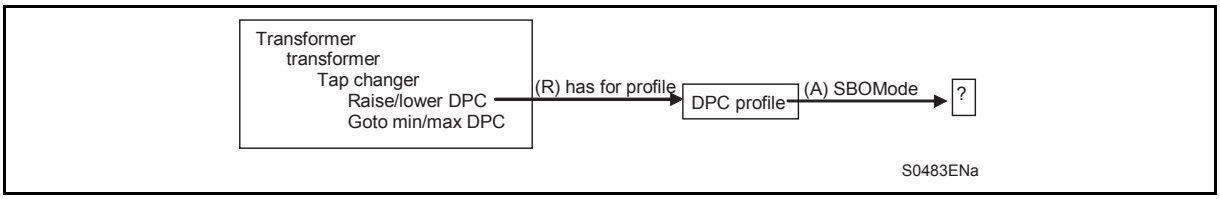
37212 / TapChanger / The constraint is not valid:[current valid range (% maximum value) > (2 / (maximum acq. value - minimum acq. value))]

- current valid range (% maximum value) < (100 / (maximum value - minimum value))

37212 / TapChanger / The constraint is not valid:[current valid range (% maximum value) < (100 / (maximum value - minimum value))]

37363 Min and max value of transformer don't belong to the interval minimum value - maximum value of the TPI (MinUsablePosition < MinScaledValue and/or MaxUsablePosition > MaxScaledValue)

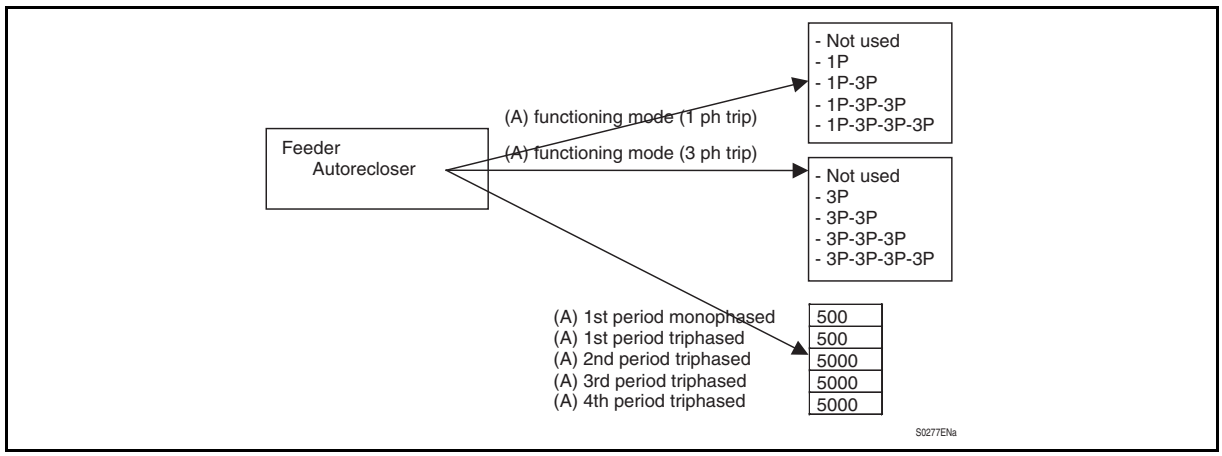
2.5.5.2 RaiseLower / GoToMinMax coherence



On Tap changer, if the Raise/lower DPC is SBO Many, forbid the Goto min/max DPC

37178 / TapChanger / When Raise/lower DPC is SBO Many, Goto min/max DPC is not allowed

2.5.6 AutoRecloser function



- The two attributes "functioning mode (1 ph trip)" and "functioning mode (3 ph trip)" must not be both set to "Not used" value.

41096 / Autorecloser / The attribute values are not compatible-> [functioning mode (1 ph trip) = Not used, functioning mode (3 ph trip) = Not used]

- If "functioning mode (1 ph trip)" value is set to "1P-3P-3P-3P", then the following rules must be respected:
  - "1st period monophased" < "2nd period triphased"
  - "1st period monophased" < "3rd period triphased"
  - "1st period monophased " < "4th period triphased"

If "functioning mode (1 ph trip)" value is set to "1P-3P-3P", then the following rules must be respected:

- "1st period monophased" < "2nd period triphased"
- "1st period monophased" < "3rd period triphased"

If "functioning mode (1 ph trip)" value is set to "1P-3P", then the following rule must be respected:

- "1st period monophased" < "2nd period triphased"

41103 / Autorecloser / 1st period monophased (ms) is not lower than 2nd period triphased (ms)

41103 / Autorecloser / 1st period monophased (ms) is not lower than 3rd period triphased (ms)

41103 / Autorecloser / 1st period monophased (ms) is not lower than 4th period triphased (ms)

- If "functioning mode (3 ph trip)" value is set to "3P-3P-3P-3P", then the following rules must be respected:
  - "1st period triphased" < "2nd period triphased"
  - "1st period triphased" < "3rd period triphased"
  - "1st period triphased" < "4th period triphased"

If "functioning mode (3 ph trip)" value is set to "3P-3P-3P", then the following rules must be respected:

- "1st period triphased" < "2nd period triphased"
- "1st period triphased" < "3rd period triphased"

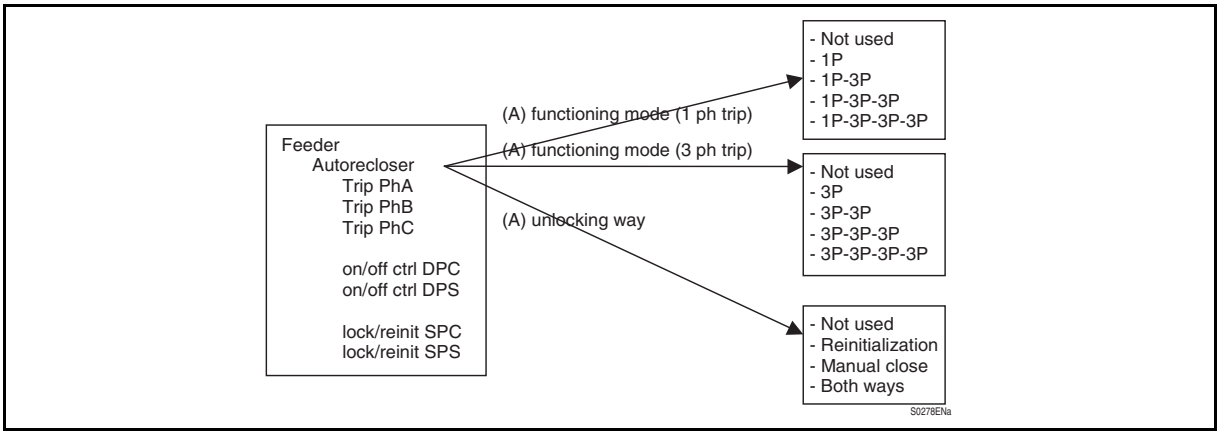
If "functioning mode (3 ph trip)" value is set to "3P-3P", then the following rule must be respected:

- "1st period triphased" < "2nd period triphased"

41103 / Autorecloser / 1st period triphased (ms) is not lower than 2nd period triphased (ms)

41103 / Autorecloser / 1st period triphased (ms) is not lower than 3rd period triphased (ms)

41103 / Autorecloser / 1st period triphased (ms) is not lower than 4th period triphased (ms)



- If "functioning mode (1 ph trip)" value is different from "Not used", then at least one of the three SPS datapoints { "Trip PhA", "Trip PhB", "Trip PhC" } is mandatory.

41090 / Autorecloser / One of the datapoints is missing-> [Trip PhA, Trip PhB, Trip PhC]

- If "functioning mode (1 ph trip)" value is set to "Not used", then none of the three SPS datapoints { "Trip PhA", "Trip PhB", "Trip PhC" } is allowed.

41097 / Autorecloser / The attribute value is incompatible with the datapoints-> [functioning mode (1 ph trip) = Not used, Trip PhA, Trip PhB, Trip PhC]

- The two datapoints { "on/off ctrl DPC", "on/off ctrl DPS" } are mutually exclusive and, at least one of them is mandatory.

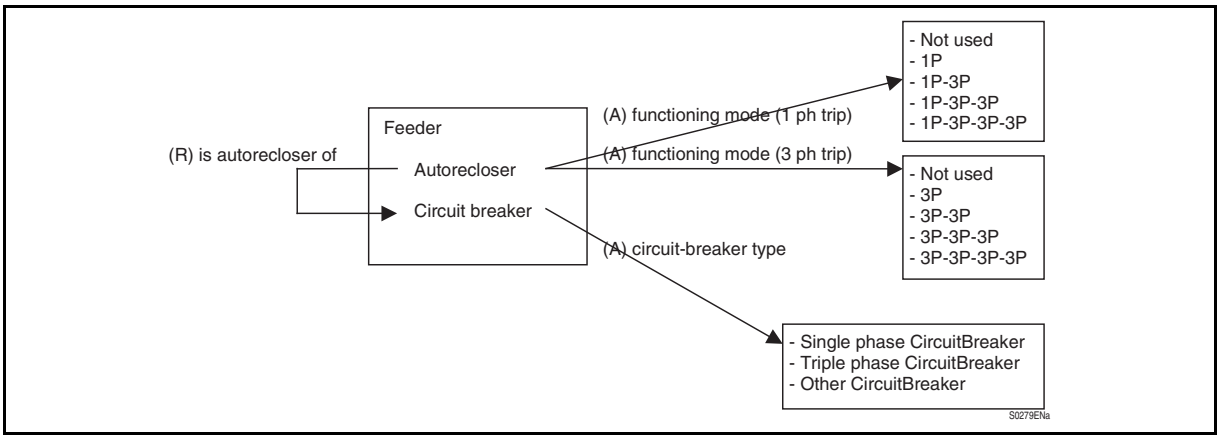
41066 / Autorecloser / The datapoints are not compatible-> [on/off ctrl DPC, on/off ctrl DPS]

41090 / Autorecloser / One of the datapoints is missing-> [on/off ctrl DPC, on/off ctrl DPS]

- The two datapoints { "lock/reinit SPC", "lock/reinit SPS" } are mutually exclusive. If the "unlocking way" attribute value is set to "Reinitialization" or "Both ways" then, at least one of the two datapoins is mandatory.

41066 / Autorecloser / The datapoints are not compatible-> [lock/reinit SPC, lock/reinit SPS]

41090 / Autorecloser / One of the datapoints is missing-> [lock/reinit SPC, lock/reinit SPS]



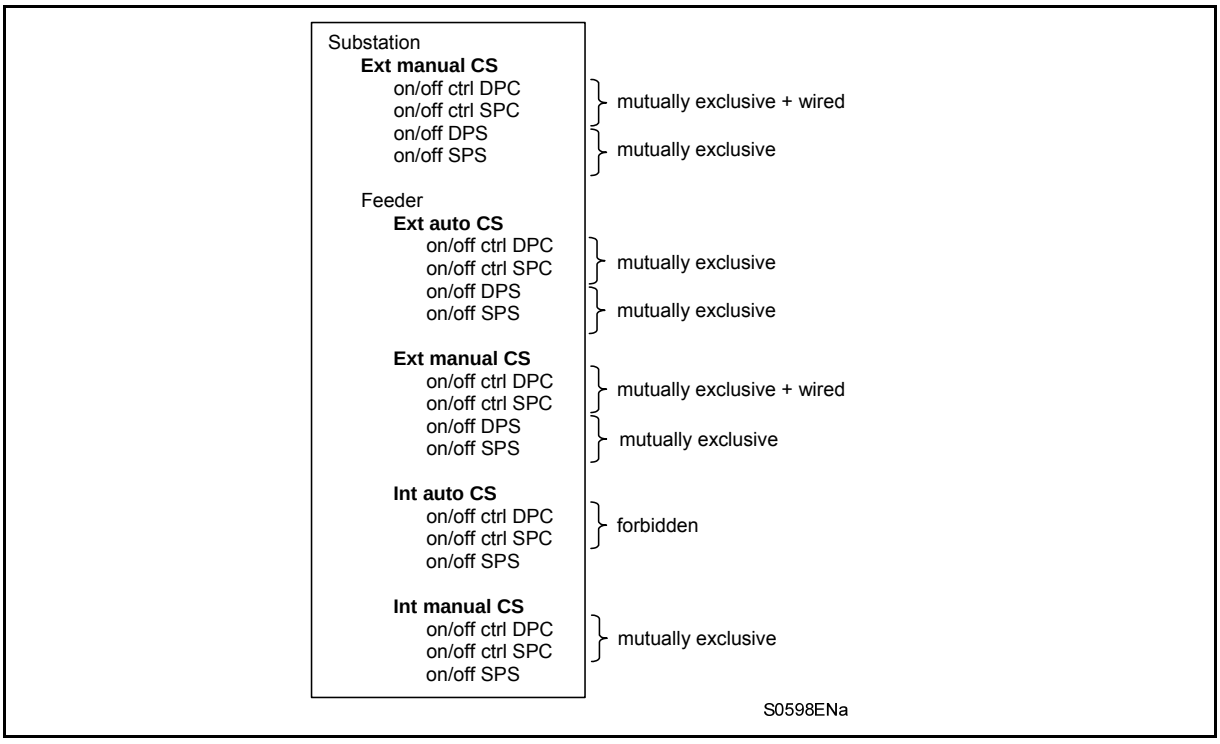
- If "functioning mode (1 ph trip)" value is different from "Not used", then the "circuit-breaker type" must be set to "Single phase CircuitBreaker".

41096 / Autorecloser / The attribute values are not compatible-> [functioning mode (1 ph trip) = 1P, Site | Substation | Voltage level | Feeder | circuit breaker | circuit-breaker type = Triple phase CircuitBreaker]

- If "functioning mode (3 ph trip)" value is set to "Not used", then the "circuit-breaker type" must be set to "Single phase CircuitBreaker".

41096 / Autorecloser / The attribute values are not compatible-> [functioning mode (3 ph trip) = Not used, Site | Substation | Voltage level | Feeder | circuit breaker | circuit-breaker type = Triple phase CircuitBreaker]

2.5.7 Synchrocheck function



- As shown in the picture, under a Synchrocheck function, some Datapoints are mutually exclusive and some must be wired.

NOTE: Here, the term "wired" means that the datapoint must be linked to a digital/analogue channel of a computer, or linked to an IED address.

42066 / Synchrocheck / The datapoints are not compatible-> [on/off ctrl DPC, on/off ctrl SPC]

42066 / Synchrocheck / The datapoints are not compatible-> [on/off SPS, on/off DPS]

42099 / Synchrocheck / The datapoint is not wired

- For a "Int manual synchrocheck" function, the "on/off ctrl DPC" or "on/off ctrl SPC" Datapoint must be present.

42090 / Synchrocheck / One of the datapoints is missing-> [on/off ctrl DPC, on/off ctrl SPC]

- For a "Int automatic synchrocheck" function, the "on/off ctrl DPC" or "on/off ctrl SPC" Datapoint are not allowed.

42094 / Synchrocheck / The datapoint is not allowed-> [on/off ctrl xPC]

- Only one internal synchrocheck can be configured on a per computer basis.

42151 / Synchrocheck / More than one internal synchrocheck on the same computer

- For an internal synchrocheck, all associated circuit-breakers must be managed by the same computer than the synchrocheck.

42152 / Synchrocheck / The internal synchrocheck and the breaker have not the same manager

- For an internal synchrocheck, the computer managing the synchrocheck must have a TMU200 or a TMU220 board.

42159 / Synchrocheck / The manager of the internal synchrocheck have not a TMU200 Board

- For an internal synchrocheck, if the datapoint CS_BusBarVChoice_SPS exists under the synchrocheck, the associated TMU board must be a TMU220

42204 / Synchrocheck / The TMU220 board is missing for datapoint usage in reference

- For an internal synchrocheck, if set as type 2, the associated TMU board must be a TMU210

42264 / Synchrocheck / The TMU210 board is missing for synchrocheck of type 2

- For an internal synchrocheck, if set as type 2, the datapoint CS_BusBarVChoice_SPS mustn't exists

42265 / Synchrocheck / The BusBar V Choice datapoint is not allowed for synchrocheck of type 2

- For an internal synchrocheck, if set as type 2, all this datapoints must exists:
  - Bypass
  - Scheme Coupling
  - Scheme Locking
  - Scheme LD/BD
  - Scheme LD/BL
  - Scheme LL/BD
- *42276* / Synchrocheck / *The datapoint is missing-> [Bypass]*
- For an internal synchrocheck, if *set* as type 1, all this datapoints must not exists :
  - Bypass

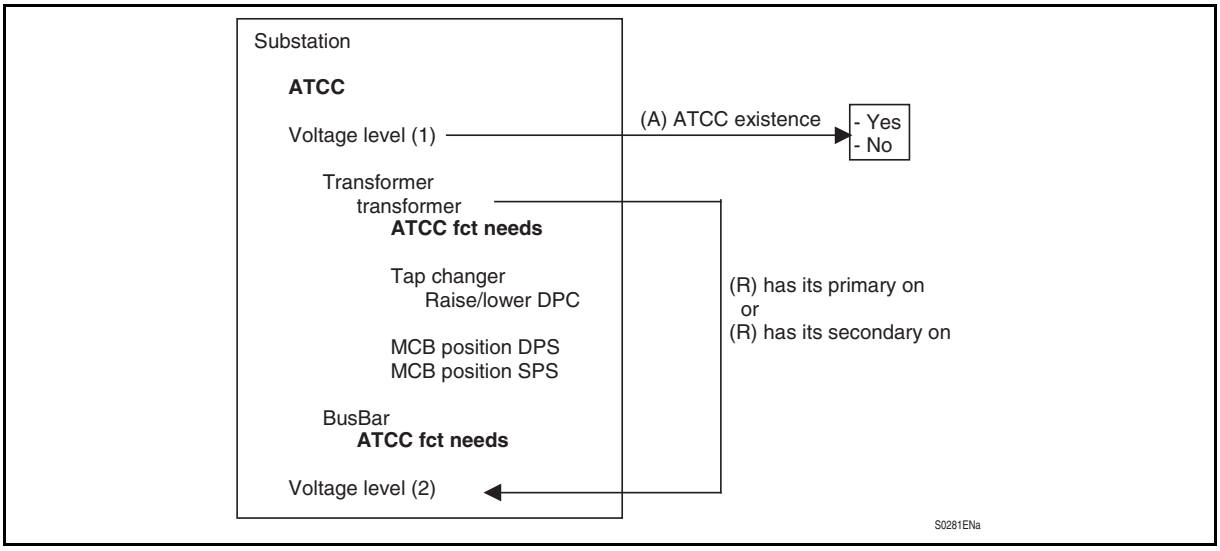
- Scheme Coupling
- Scheme Locking
- Scheme LD/BD
- Scheme LD/BL
- Scheme LL/BD

42277 / Synchrocheck / The datapoint is not allowed-> [Bypass]

- For an internal synchrocheck, if coupling function is set, the value of Ta can not be null.

42326 / Synchrocheck / The value of Ta can not be null for the coupling function usage

2.5.8 ATCC function



- If there is no ATCC under the Substation, then:
  - a "Voltage level" must not have its "ATCC existence" attribute set to "Yes".
  - the "ATCC fct needs" is allowed neither under a "transformer" nor under a "BusBar".

26101 / ATCC / The attribute value is not valid-> [ATCC existence, Yes]

26109 / ATCC / The component is not allowed-> [ATCC fct needs]

- If there is an "ATCC fct needs" under a "transformer", then:
  - the "Tap changer" with its "Raise/lower DPC" Datapoint are mandatory.
  - one of the two Datapoints { "MCB position DPS", "MCB position SPS" } is mandatory. They are mutually exclusive.
  - the "transformer" must be linked to a Voltage level through one and only one of the relations { "has its primary on", "has its secondary on" }. The Voltage level must be different from the one under which the transformer is located.

26110 / ATCC / The component is missing-> [Tap changer]

26089 / ATCC / The datapoint is missing-> [Raise/lower DPC]

26090 / ATCC / One of the datapoints is missing-> [MCB position DPS, MCB position SPS]

26066 / ATCC / The datapoints are not compatible-> [MCB position DPS, MCB position SPS]

26111 / ATCC / The link to primary or secondary voltage level is missing

26044 / ATCC / The relation types are not compatible-> [has its primary on, has its secondary on]

26050 / ATCC / The relation link is not valid-> [has its primary on: Voltage level]

- If an ATCC is defined, then all Switchgears and Circuit Breakers must have a Switchgear Position datapoint.

26090 / ATCC / One of the datapoints is missing -> [Switchgear position]

- If an ATCC is defined, then the voltage MV of transformer or BusBar ATCC functions can't be wired both:
  - If voltage MV of transformers are wired (in board or on IED), voltage MV of BusBar must be computed.
  - If voltage MV of BusBar are wired (in board or on IED), voltage MV of transformers must be computed.

26176 / ATCC / The voltage MV wiring of an ATCC function is not compliant full ATCC description

2.5.9 Protection module

The following checks concerns protection functions embedded in MICOM C264P . They required the presence of the TMU210 board for the MICOM C264P .

- As soon as one or several bays managed by a MICOM C264P , have got a integrated protection function, this MICOM C264P must contain a TMU210 board.

<09153>/ Calculator boards / The TMU210 board is missing for protection function usage

- For the set of bays managed by a MICOM C264P , each kind of protection function can be present only once.

<55154> / Module protection / Kind of protection module is defined more than once.

For the set of bays managed by a MiCOM C264P:

- as soon as one of them uses a protection function, the "relay automatism" function must be present.
- if a 81U exists, a 81O must also exist
- if a 81O exists, a 81U must also exist
- if a 81R exists, both 81U and 81R must exist

<55155> / Module protection / "relay automatism" function is missing.

<55156> / Module protection / "81O" function is missing.

<55157> / Module protection / "81U" function is missing.

<55158> / Module protection / "81O"or "81U" function is missing.

<55329> / Module protection / "81O"or "81U" functions muusy have the same trip usage values.

2.5.9.1 EPATR function

When a TMU210 is configured with attribute ‘EPATR tore type‘ set to a value different from ‘not used’, the EPATR function is active for this board. Subsequently, the following checks are implemented:

- For the set of bays managed by the relevant computer, the protection function ‘67N’ is required.

<71215> / EPATR / the protection function 67N is missing for EPATR usage

- The following datapoints are required under the 67N protection function:

15A_over_current, 1_2_s_over_current, EPATR_RSE_Mode, EPATR_DSP_RSE_Mode

<71216> / EPATR / the datapoint is missing for EPATR usage: <required datapoint short name>

2.5.10 Topology

The following checks concern the electrical topology, i.e. nodes values existing at electrical module level. They are run when an ATCC function or a Fast Load Shedding function is configured. In the folloqing, used node means node whose value is different from 65535

- The used nodes of a module can not have the same value.

<74239> / Topology / the nodes of a module can not have the same value

- Two modules can not have the same set of used nodes.

<74240> / Topology / two modules can not have the same node values

- For a transformer, its adjacent non-generic modules located in the same Transformer bay should have at least 2 used nodes.

<74241> / Topology / node values are missing for modules (at least 2 values are required)

2.5.11 Fast Load Shedding

If LSP datapoints exist in configuration data base the relation ‘has for main FLS server’ is mandatory at site level

<75244> / Fast load shedding / Site / Relation 'Has for main FLS server' mandatory to manage LSP datapoints

2.5.12 Load shedding/ Load Curtailement

A computer can manage only one load shedding function and/or only one load curtailment function. Load function are configured at bay level.

- 79278 / Load function / RTU | Computer | C264_LS / Invalid number of load curtailment managed by the computer, only one load curtailment function must be configured per computer (load curtailment functions)->
  - [Site | Substation | Electrical Bay | Generic bay | Load function 1,
  - Site | Substation | Electrical Bay | Generic bay 1 | Load function,
  - Site | Substation | Electrical Bay | Generic bay 1 | Load function 1]

2.5.13 I²t function

- When I²t function is configured, the 67 relay function must exist.

81280 / I²t function / Site | Substation | Voltage level | Generic bay | I²t function / The protection module '67' is missing for the computer, mandatory for I²t function.

- TMU210 board must exist at computer level if I²t function is configured.

09153 / ComputerBoards / Scs | Ethernet network | C264 / The TMU210 board is missing for protection module usage at computer level.

- TMU210 board must compute the MV below if I²t function is configured.
  - IT_phase_A
  - IT_phase_B
  - IT_phase_C
  - IT_total
  - I2T_phase_A
  - I2T_phase_B
  - I2T_phase_C
  - I2T_total

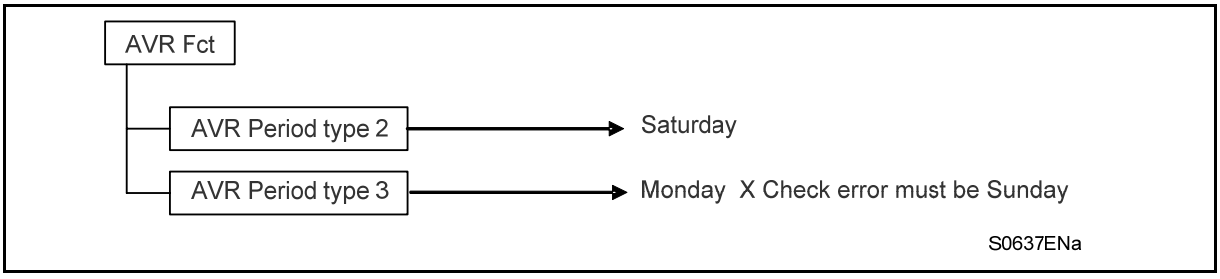
81281 / I²t function / Site | Substation | Voltage level | Generic bay | I²t function / Missing mandatory computed MV for I²t function (Computed MV)-> [I²T: IT_phase_A]

- Only one I²t function can be configured per computer.

55154 / Protection module / Site | Substation | Voltage level | Generic bay 1 | I²t function. The protection module still exists for the computer-> [Scs | Ethernet network | C264].

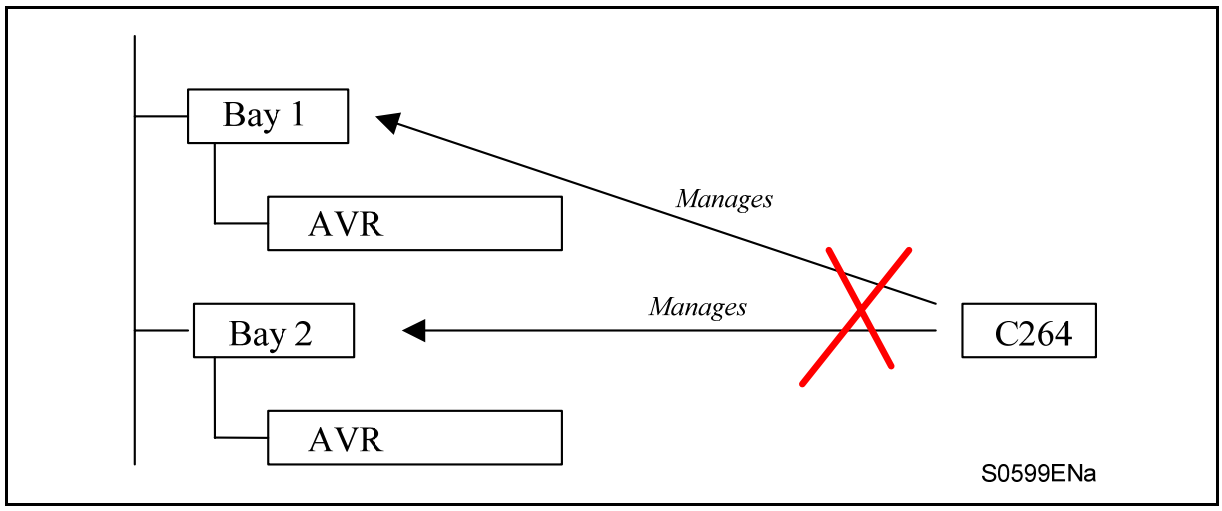
2.5.14 AVR Function

- The two Days chosen for week end days on AVR Period Type 2 and Type 3 must be consecutive days.



84295 / AVR / Site | Substation | Voltage level | AVR | AVR / Week end days configured on AVR period type 2 and type 3 must be two consecutive days (first day, second day).

- Computer can manages one and only one AVR function.



84298 / AVR / Scs | Ethernet Network | C264 / Invalid count of AVR managed by the same computer (count,max,managed AVR functions)

- In same configuration database AVR must be configured with same mode : Stand Alone XOR Master Follower in parallel XOR MCC

84299 / AVR / Substation / AVR functions with different working mode is not compatible

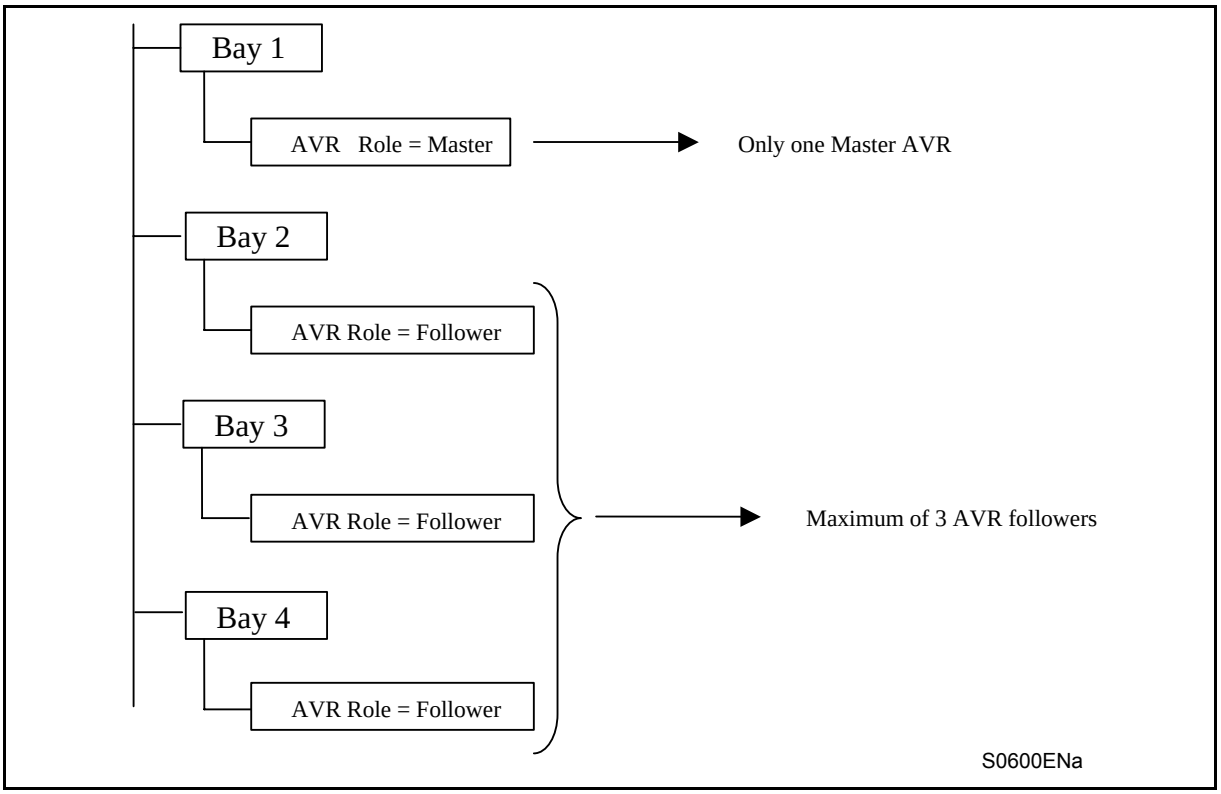
- Maximum of four AVR function configured in Master Follower in parallel or MCC

84300 / AVR / Substation / Invalid count of AVR function for Master follower in parallel mode or MCC mode (count, max)

- For AVR function configured in Master Follower in parallel or MCC mode, one and only AVR with role “Master” must be configured an a maximum of 3 “Follower” can be configured.

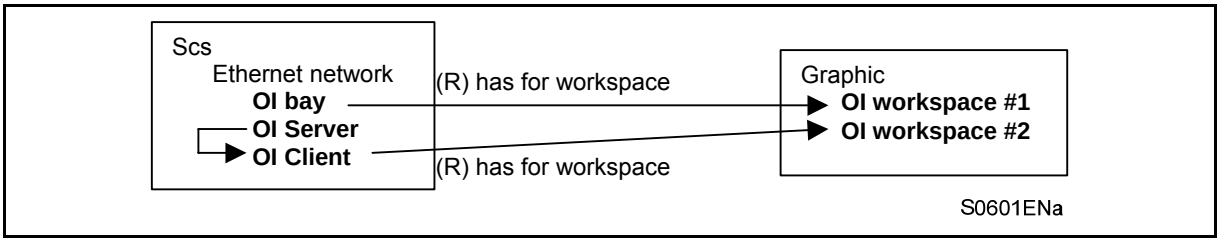
84301 / AVR / Substation / Invalid count of AVR master (count of master, min of master, max of master)

84302 / AVR / Substation / Invalid count of AVR slave (count of slave, min of slave, max of slave)



2.6 Graphical checks

2.6.1 O I Workspace



2.6.1.1 Display resolution

An OI Workspace which has for display resolution 800x600 must be used only by an OI Bay

78267 / OI Workspace / The displayed resolution 800x600 must be used only by an OI Bay

2.6.1.2 Limitations

An OI workspace shouldn't contain more than 150000 graphic objects (i.e. graphical symbols).

78313 / OI Workspace / The number of graphical objects by OI Workspace exceed the acceptable limit (count of objects, max value)

2.6.1.3 OI Bay limitations

- A workspace used by an OI Bay must respect some constraints.

Alarm, Title and Command banners are not allowed in 800x600 resolution.

78268 / OI Workspace / The Alarm, Title and Command banners are not allowed in a 800x600 workspace -> [forbidden component]

- Up to five mimics are allowed by workspace.

78269 / OI Workspace / Up to five mimics are allowed in an OI Bay workspace -> [mimic count]

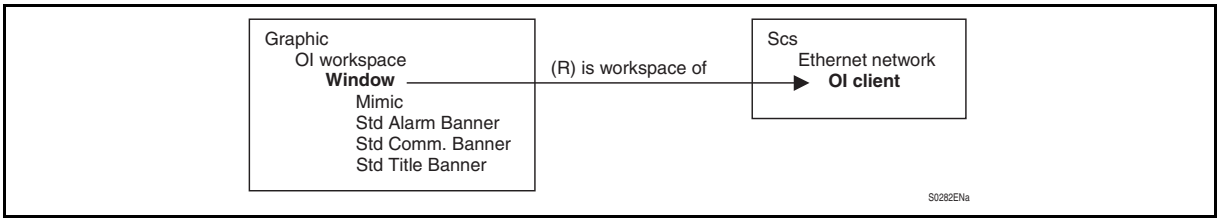
- The count of Active X must respect the following rules:
  - Only one alarm viewer and one trend viewer can be configured
  - FSS viewer is not allowed

78270 / OI Workspace / The count of an activeX type is not good in an OI Bay workspace -> *[ActiveX type, allowed, count]*

- The workspace of an OI Bay in 800x600 resolution must have at least actions Login and Exit (actions are specific launch actions):

78277 / OI Workspace / The mandatory action type is not defined for the 800x600 workspace -> [action type]

2.6.2 OI Window



An OI "Window" which has its "OI workspace" linked to at least 1 "OI client", must not be empty.

It must contain at least one of the following components:

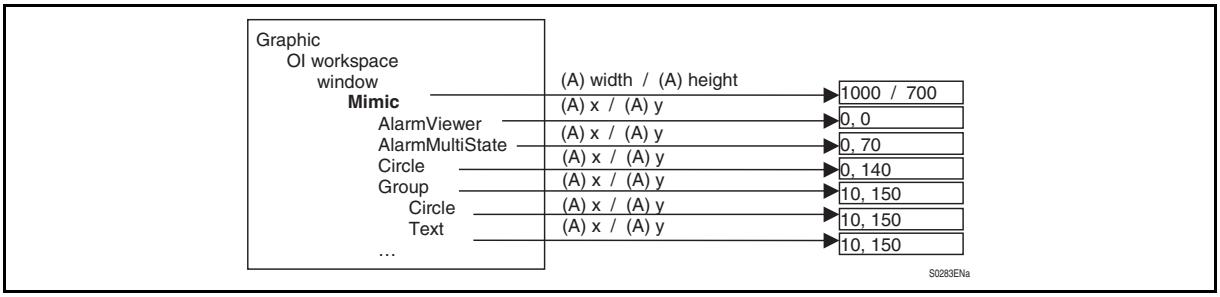
- Mimic(s)
- one Standard alarm banner
- one Standard command banner
- one Standard title banner

43117 / Window / The Window is empty

2.6.3 OI Mimic

2.6.3.1 Symbols

- Coordinates of symbols



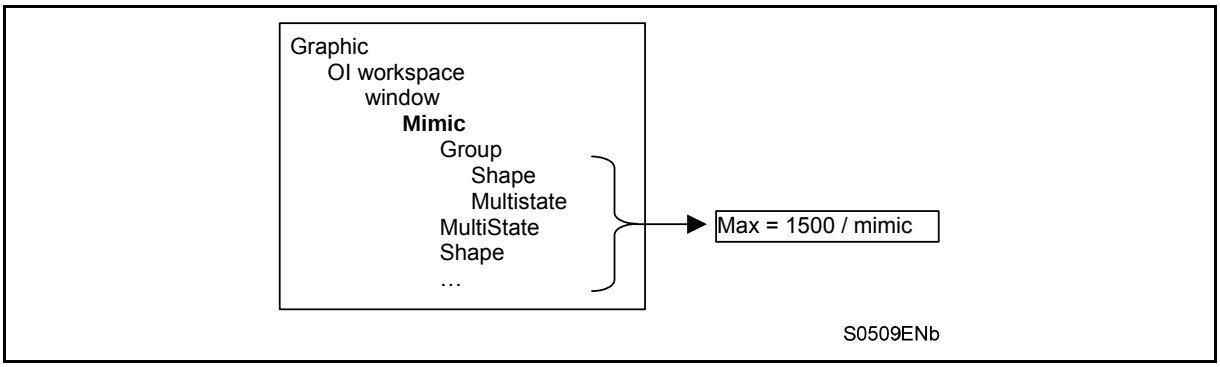
The coordinates (x, y) of a symbol must not be located outside the mimic area.

47122 / Symbol / The symbol is outside the mimic area

Example:

47122 / Symbol / The symbol is outside the mimic area (1000, 700)-> [x = 1085, y = 55]

- Limits of the count of Symbols :



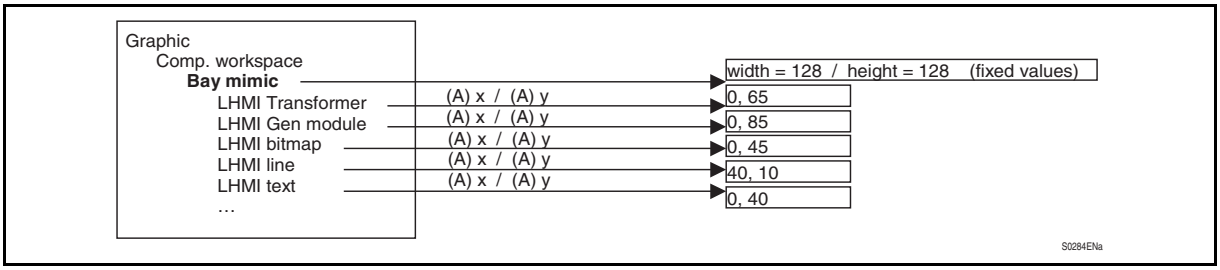
The number of symbols (shapes or multistates) can't exceed 1700 inside a mimic. This count is done recursively. The groups are not count, but their sons yes.

02003 / CapacityLimits / The count of Symbol components is not valid (count, maximum)

2.6.4 Bay Mimic symbols

2.6.4.1 Symbols

- Hidden Symbols:



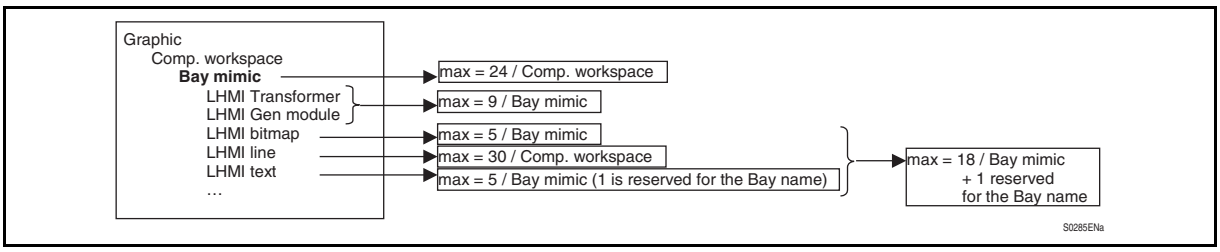
The coordinates (x, y) of a symbol must not be located outside the mimic area.

47122 / Symbol / The symbol is outside the mimic area

Example:

47122 / Symbol / The symbol is outside the mimic area (128, 128)-> [x = 145, y = 6]

- Limits of the count of Symbols:



Some limit exceeding are prevented by the Structural Database rules. The others leads to the following errors:

02003 / CapacityLimits / The count of … components is not valid (count, maximum)

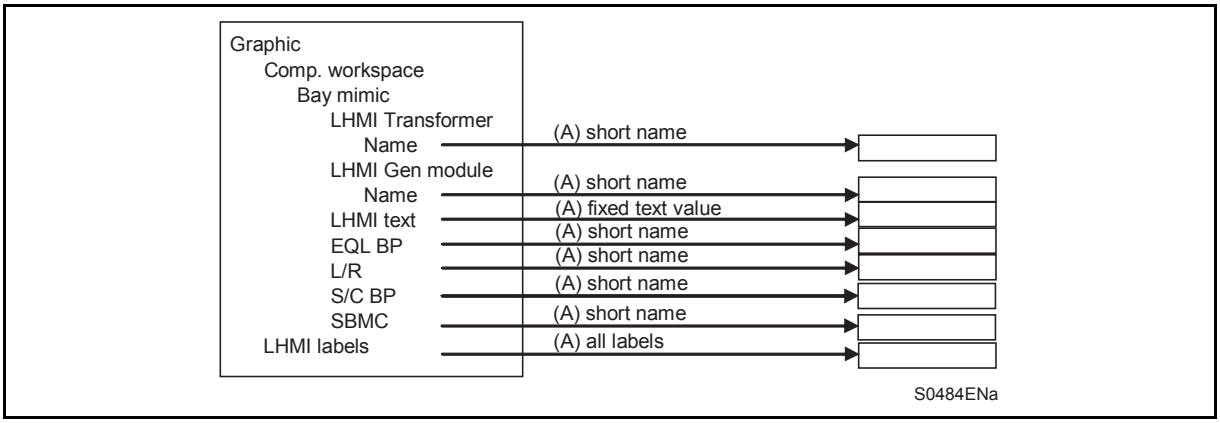
Examples:

02003 / CapacityLimits / The count of LHMI Gen module, LHMI Transformer components is not valid (count, maximum)-> [10, 9]

02003 / CapacityLimits / The count of LHMI bitmap, LHMI line, LHMI text components is not valid (count, maximum)-> [21, 18]

02003 / CapacityLimits / The count of LHMI line components is not valid (count, maximum)-> [35, 30]

- Empty texts:

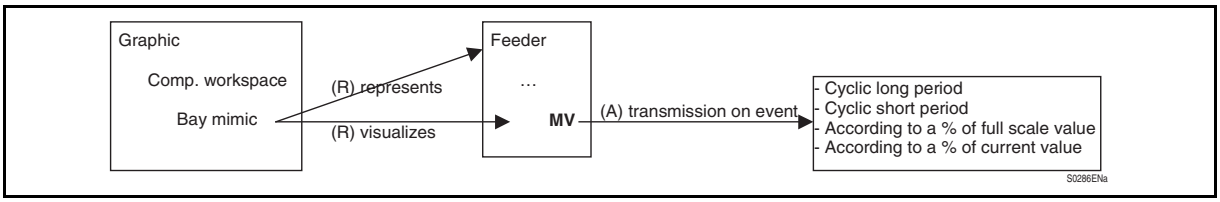


The text of a symbol or labels must not be empty. The check is done for languages use by computer generator.

47187 / Symbol / The text symbol of a Local HMI mustn't be empty (Language)

47188 / Symbol / The local HMI label mustn't be empty (Label name, Language)

2.6.4.2 Visualized MV datapoints



- An MV Datapoint visualized in a "Bay mimic" (relation "visualizes") must be produced by a TMU board.

33168 / BayMimic / The MV datapoint must be produced by TMU board for bay visualization

- An MV Datapoint visualized in a "Bay mimic" (relation "visualizes") must belong to the bay represented by the "Bay mimic" (relation "represents").

33125 / BayMimic / The datapoint does not belong to the bay (datapoint, bay)-> [visualizes: Voltage Level MV, represents: Feeder]

- For each visualized MV Datapoint, the "transmission on event" attribute must be set neither to "Cyclic short period" value nor to "Cyclic long period" value to avoid overflow of the Bay mimic input buffer.

33123 / BayMimic / The attribute value is not compatible with the relation-> [transmission on event = Cyclic short period, is visualized by: Bay mimic]

2.6.5 Standard Command Banner

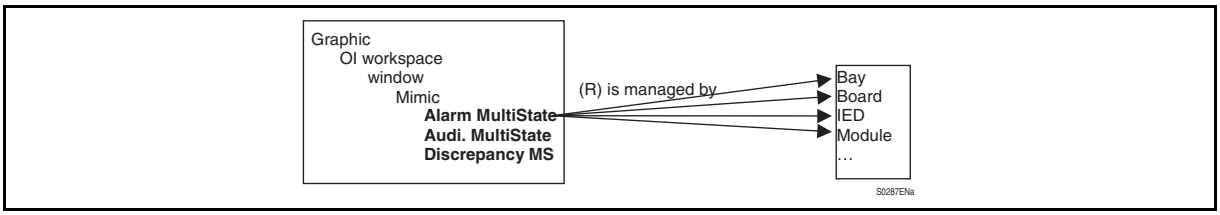
2.6.5.1 OI Bay

- The Klaxon usage value on a Standard Command Banner of an OI Bay must be set to No, because OI bay doesn't manage Klaxon option.

76255 / OI Bay/ Klaxon usage value on Standard Command Banner of an OI Bay must be set to No (OI Bay)

2.6.6 OI symbols

2.6.6.1 Multi-States



For each Multi-State: **1**, and only 1, relation "is managed by" must be linked.

49130 / MultiState / At least one relation must be linked-> [is managed by]

49113 / MultiState / Multiple links-> [is managed by: …]

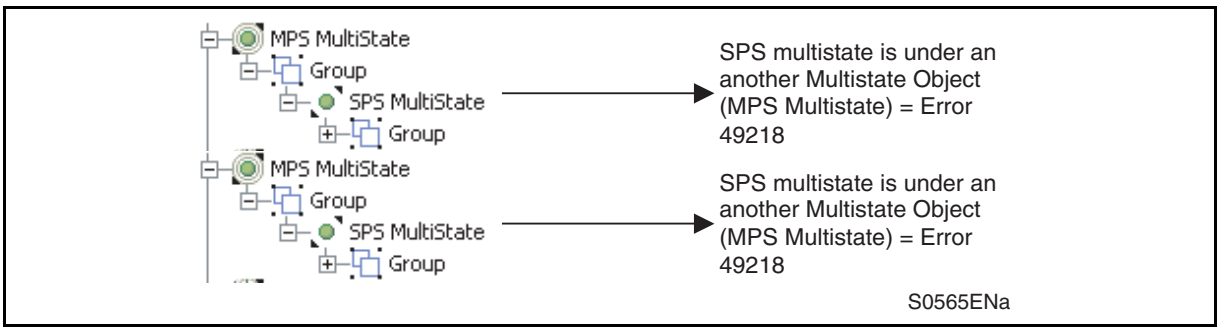
Example:

49113 / MultiState / Multiple links-> [is managed by: Feeder]

Multistate can't have another MultiState as parent (at any level)

49218 / MultiState / A multistate must not be a sub-object of another mulitstate (Parent Object)

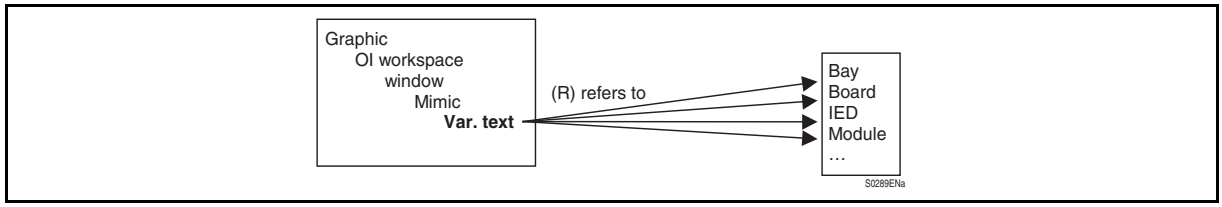
Exemple :



A multistate can only use symbol defined inside itself

49231 / MultiState / A multistate must reference only symbol defined inside it (Symbol)

2.6.6.2 Var Texts



For each "Var.Text": **1**, and only 1 relation "refers to" must be linked.

For each "Launch Action": **1**, and only 1 relation "acts on" must be linked.

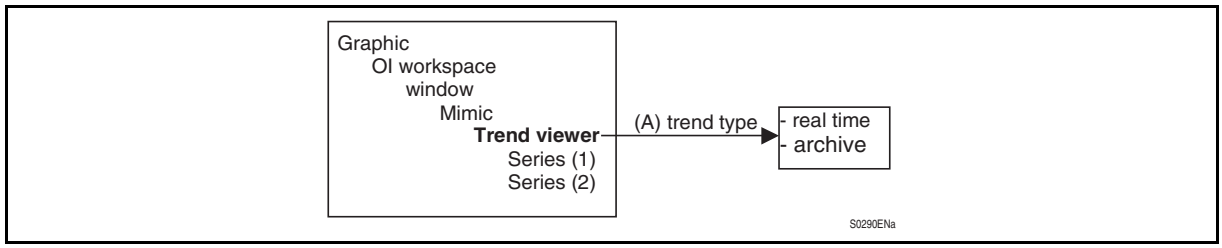
47130 / Symbol / At least one relation must be linked-> [refers to]

47113 / Symbol / Multiple links-> [refers to: …]

Example:

47113 / Symbol / Multiple links-> [refers to: Feeder]

2.6.6.3 Trend viewer



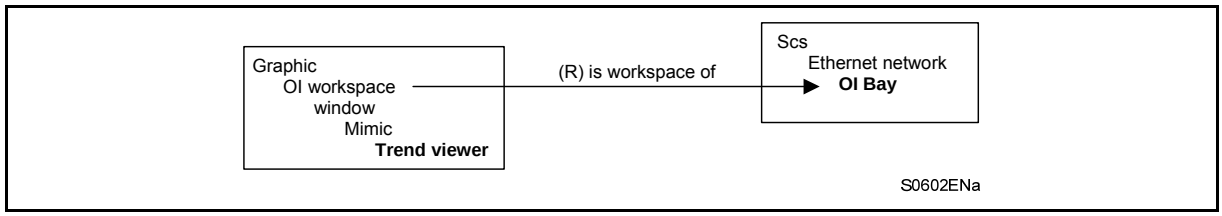
If a "Trend viewer" has its "trend type" attribute set to "real time", then it can have only **1** "Series".

45003 / TrendViewer / The count of Series components is not valid (count, maximum)

Example:

45003 / TrendViewer / The count of Series components is not valid (count, maximum)-> [2, 1]

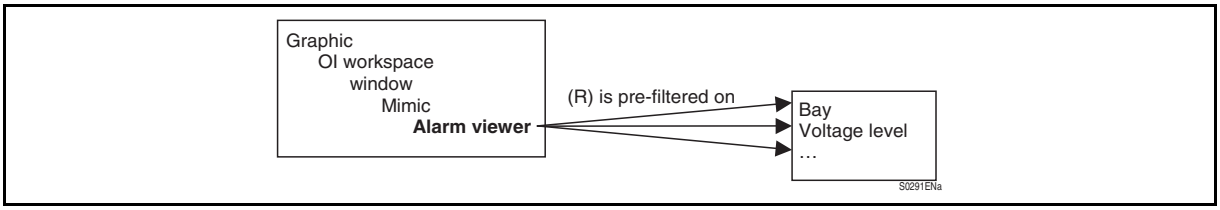
In case of usage by an OI Bay in 800x600 resolution, there's some limitations.



- The trend viewer type must be set to 'real time'

45275 / TrendViewer / The trend type must be set to 'real time' in a 800x600 workspace

2.6.6.4 Alarm/State viewer



For an "Alarm/state viewer", only **1** relation "is pre-filtered on" can be linked.

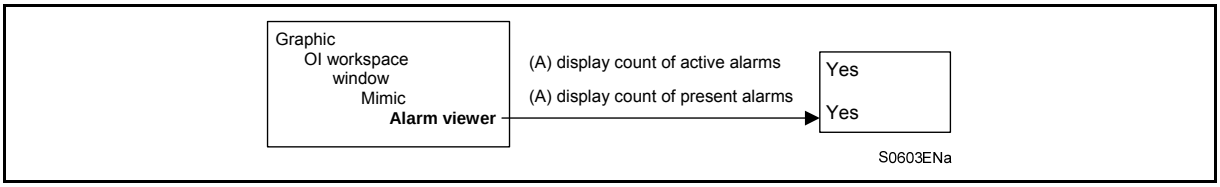
46112 / AlarmViewer / Multiple links to filters-> [is pre-filtered on: …]

Example:

46112 / AlarmViewer / Multiple links to filters-> [is pre-filtered on: Feeder]

For an “alarm/state viewer”, at least, one list must be defined.

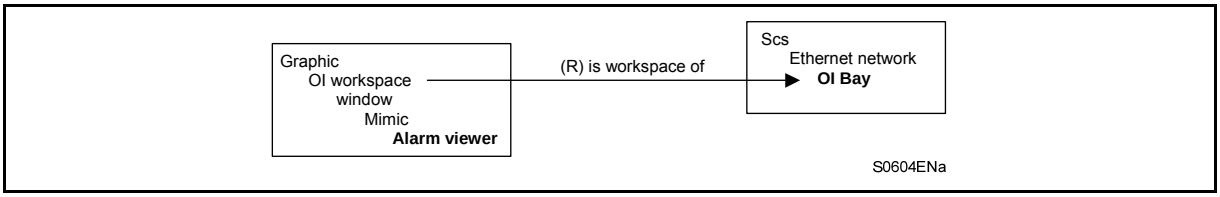
46194 / AlarmViewer / Missing a defined list for alarm/state viewer



For an “alarm/state viewer” which has a browser counting alarms, the alarm list must be defined.

46245 / AlarmViewer / The alarm list must be defined for alarm/state viewer browser which count alarms

In case of usage by an OI Bay in 800x600 resolution, there’s some limitations.



- The alarm viewer must be pre filtered

46271 / AlarmViewer / A relation “is pre-filtered on” must be defined in a 800x600 workspace

- The alarm viewer mustn’t contain event list or archive list

46272 / AlarmViewer / The list of the alarm viewer is not allowed in a 800x600workspace -> [list]

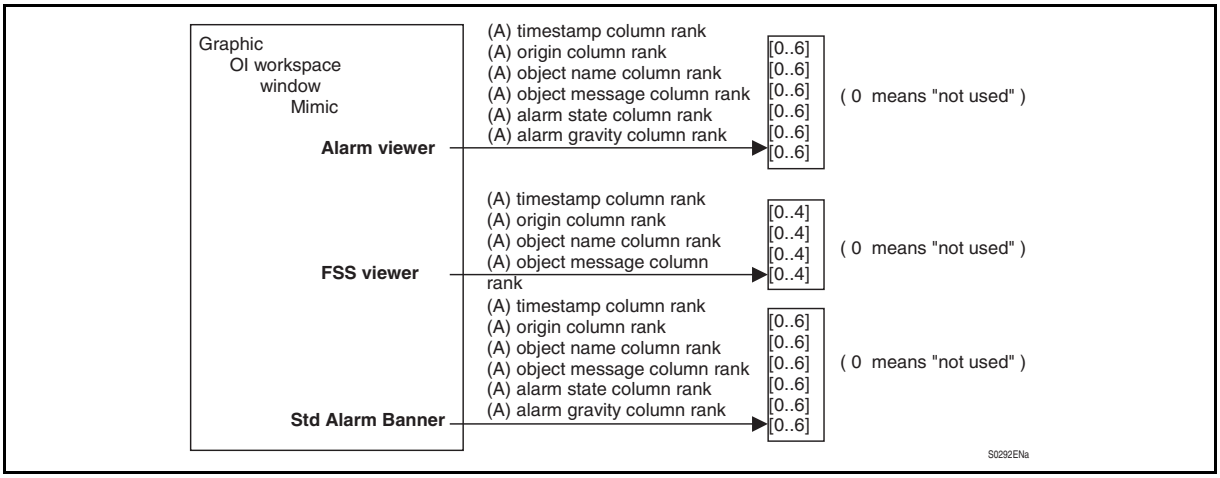
- The alarm viewer mustn’t have a contextual menu defined (contextual menu attribute must be set to ‘No’)

46273 / AlarmViewer / The contextual menu attribute must be set to ‘No’ in a 800x600workspace

- The alarm viewer toolbar must contain only Acknowledge and Clear buttons or separators (toolbar attributes for other buttons must be set to ‘0’)

46274 / AlarmViewer / A button of the toolbar mustn’t be used (the rank must be set to ‘0’) in an OI Bay workspace -> [button attribute]

2.6.6.5 ActiveX columns



For each ActiveX:

- there must be at least one column definition with a value different from **0**.
- each column value (if different from 0) must be unique

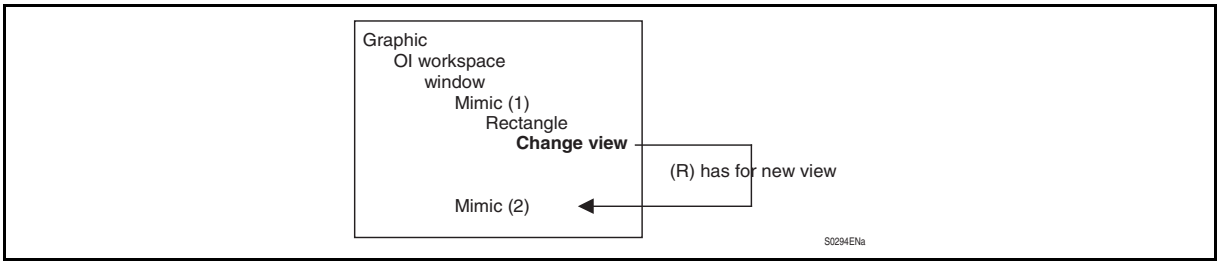
44118 / ActiveX / No column is selected

44119 / ActiveX / Multiple use of the same column rank

Example:

44119 / ActiveX / Multiple use of the same column rank-> [object name column rank, origin column rank, object message column rank, timestamp column rank, 1]

2.6.6.6 Graphic and Launch Actions

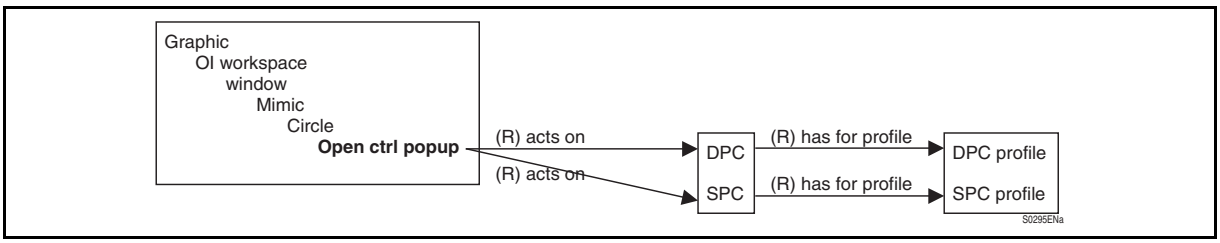


Each "has for new view" relation of a Symbol "Change view" action must be linked to another Mimic than the one under which the symbol is located.

47120 / Symbol / The initial and target mimics are identical

Example:

47120 / Symbol / The initial and target mimics are identical-> [has for new view: Mimic (1)]



For an "Open ctrl popup", all the Datapoints linked to the "acts on" relation, must fulfil the following conditions:

- all of them, or none, are linked to the same Datapoint through the relation "has for feedback"
- all of them, or none, are linked to the same Datapoint through the relation "has for AutoManu dependency"
- all of them have their attribute "Substation mode dependency" set to the same value (if the attribute is available , up to four attributes may be configured))
- all of them have their attribute "bay mode dependency" set to the same value (if the attribute is available)
- all of them have their attribute "SBMC mode dependency" set to the same value (if the attribute is available)
- all of them have the attribute "SBO mode" of their Profile set to the same value
- if the Open Control Popup authorizes the Lock function, and if one or several of them have at the same level the following datapoints: LockModule (SPS) and LockModule_SPC, then all of them must belong to the same module.

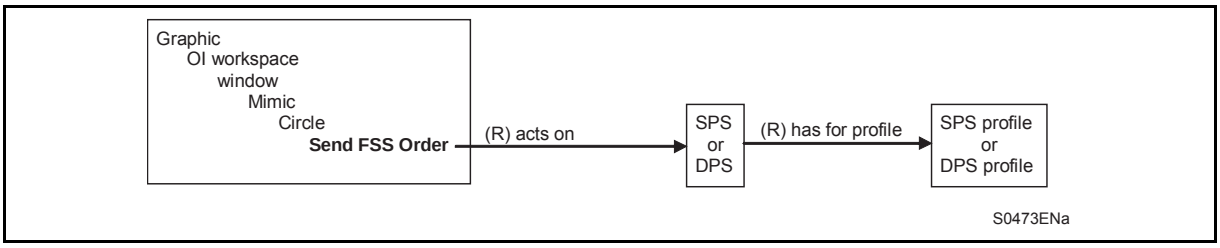
Particular check for Circuit breaker with internal synchrocheck:

- when internal synchrocheck is automatic, OpenControlPopup can acts on the Switch Ctrl xPC and Sync CB Close at same time
- when internal synchrocheck is manual, OpenControlPopup can not acts on the Switch Ctrl xPC and Sync CB Close at same time

47121 / Symbol / The linked datapoints have incompatible definitions (relations)-> [acts on]

For an "Open ctrl popup" authorizing the Locking function, the datapoints of locking "LockModule" and "LockModule_SPC" for the controlled datapoint should be present.

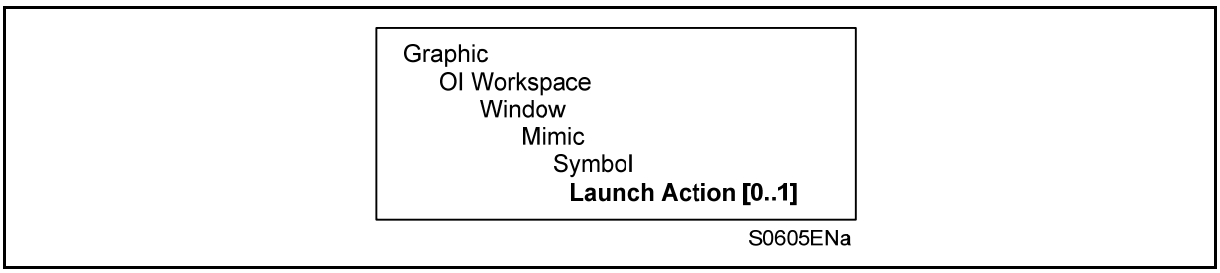
47191 / Symbol / The locking datapoints should be present (relations)-> [acts on]



For a UserAction "Send FSS Order", the datapoint (SPS or DPS) linked to the "acts on" relation must have a profile with the attribute "EnableFSS" set to true.

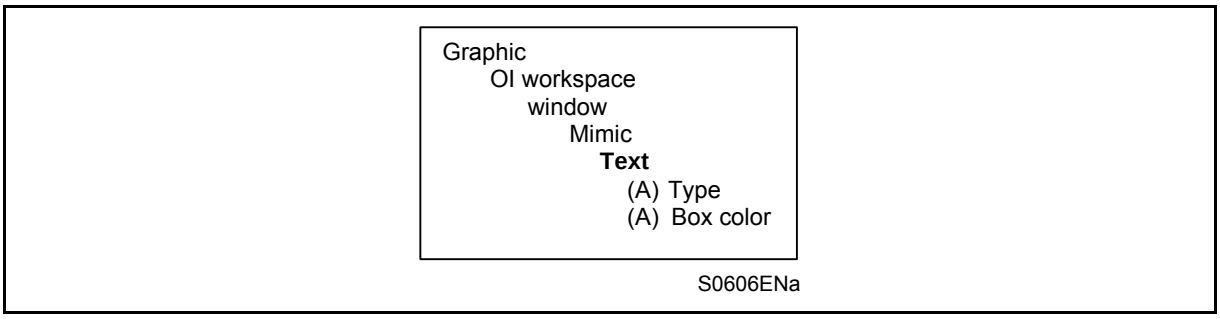
47171 / Symbol / The linked datapoint profile isn't FSS enable (relations)-> [acts on]

One and only one “Launch Action” can be configured under a Graphical symbol object



47289 / Symbol / Graphic | OI workspace | Window | Mimic | Circle / Only one launch action allowed under graphical symbol object

2.6.6.7 Text



A text which is defined as non standard type must be transparent.

47276 / Symbol / The text color is not allowed for this type -> [type, bad color, allowed color]

Try to avoid putting a SendOrder under a Text.

47304 / Symbol / It's better to avoid putting a Send Order under a Text symbol.

2.6.6.8 Image

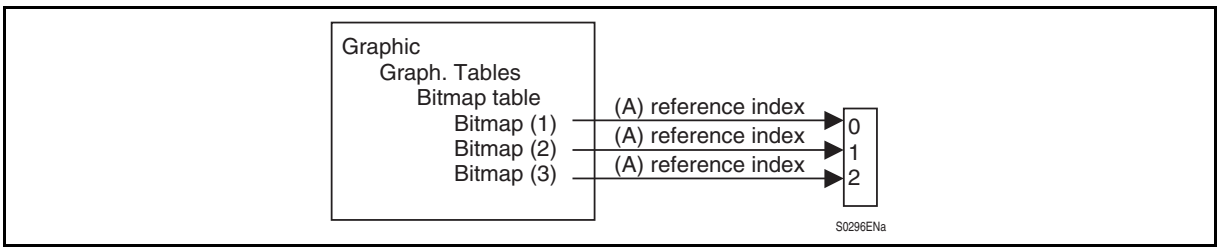
On image object the attribute "file name" must be defined.

47296 / Symbol/ Graphic | OI workspace | Window | Mimic | Image 2 / The attribute "file name" of an Image object must be defined

2.6.7 Bitmaps

All the Bitmaps of a configuration are defined in the "Bitmap table" of the configuration.

2.6.7.1 Bitmap index



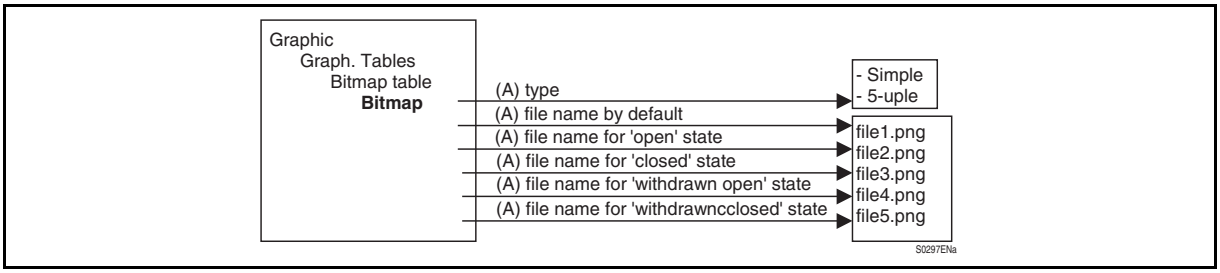
The "reference index" attribute value of each "Bitmap" of the "Bitmap table" must be unique.

48115 / Bitmap / The attribute value is not unique in the Bitmap Table

Example:

48115 / Bitmap / The attribute value is not unique in the Bitmap Table-> [reference index, 0]

2.6.7.2 Bitmap size



Depending on the "type" attribute value, 1 or 5 PNG file(s) can be linked to a Bitmap.

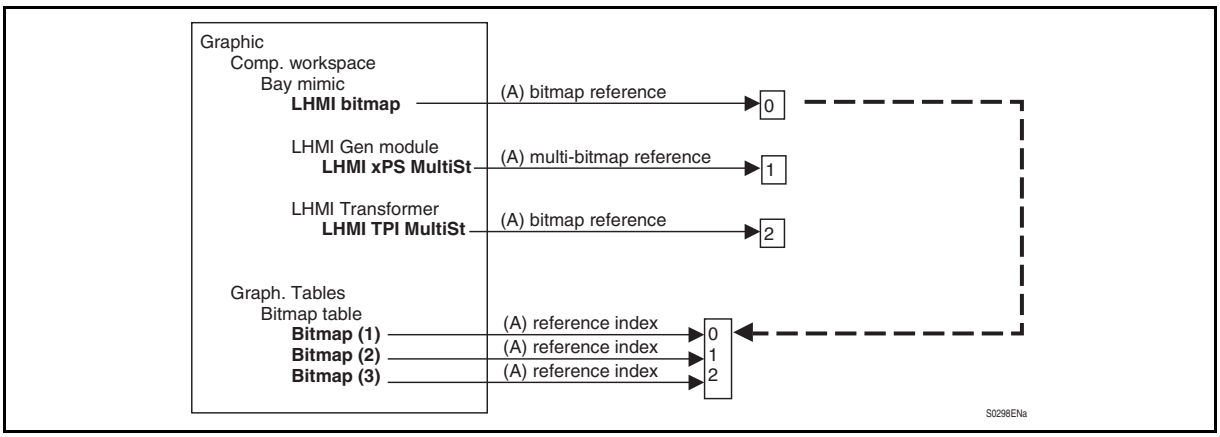
For each one, the bitmap size must be ≤ 512 bytes.

48124 / Bitmap / The bitmap size in bytes is not valid (file, size, max)

Example:

48124 / Bitmap / The bitmap size in bytes is not valid (file, size, max)-> [file name by default = file1.png, 519, 512]

2.6.7.3 Reference from BayMimic elements to Bitmap

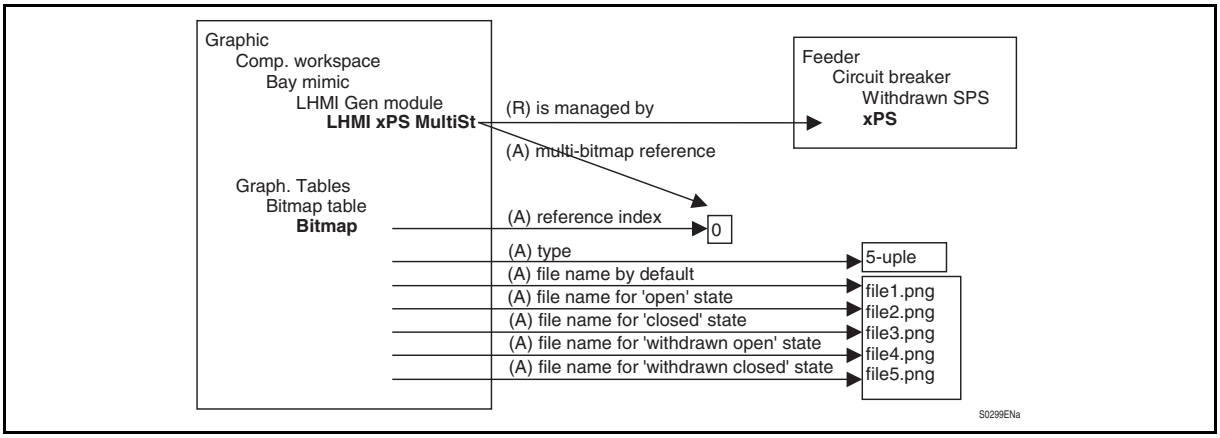


The link from an element to its bitmap is defined with the attribute: "bitmap reference". The value of this attribute must refer to an existing bitmap in the "Bitmap table".

33116 / BayMimic / The reference does not exist in the Bitmap Table

Example:

33116 / BayMimic / The reference does not exist in the Bitmap Table-> [multi-bitmap reference, 10]



The "Bitmap" linked to a "LHMI xPS MultiSt" MultiState must be defined as follows:

- its "type" attribute must be set to "5-uple" value
- its three first file names { "file name by default", "file name for 'open' state", "file name for 'closed' state" } are mandatory and each one must be unique.

Furthermore, if the MultiState is linked to a SPS or DPS Datapoint of a module containing a "Withdrawn" SPS Datapoint, through the "is managed by" relation, then the following constraints are added to the "Bitmap" definition:

- its two file names { "file name for 'withdrawn open' state", "file name for 'withdrawn closed' state" } are both mandatory and each one must be unique.

33126 / BayMimic / The attribute value of the referenced bitmap is not valid

33127 / BayMimic / The attribute value of the referenced bitmap is missing

33128 / BayMimic / Multiple use of the same attribute value in the referenced bitmap

Example:

33126 / BayMimic / The attribute value of the referenced bitmap is not valid-> [Graphic | Graph. Tables | Bitmap table | Bitmap | type, Single]

33127 / BayMimic / The attribute value of the referenced bitmap is missing-> [Graphic | Graph. Tables | Bitmap table | Bitmap | file name by default]

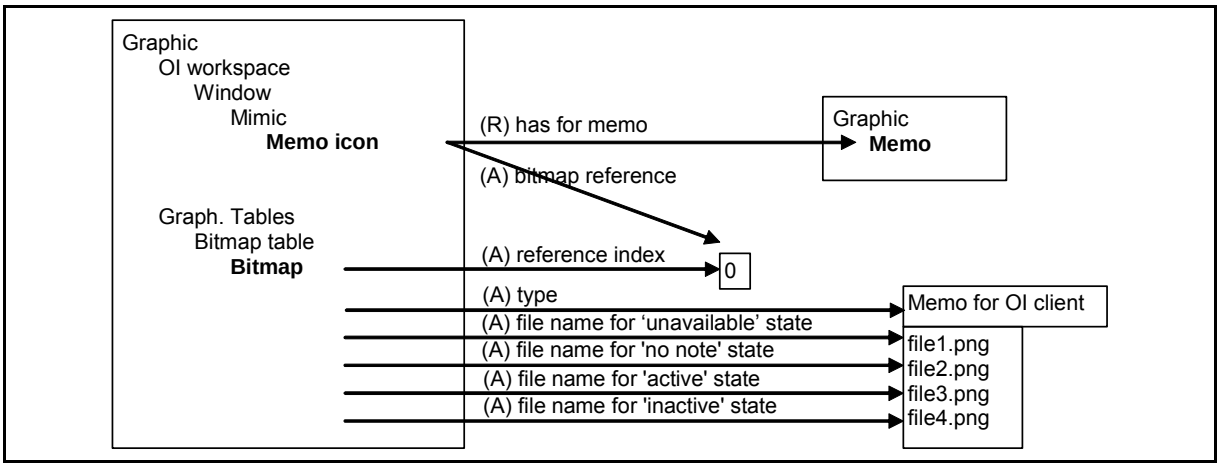
33128 / BayMimic / Multiple use of the same attribute value in the referenced bitmap-> [Graphic | Graph. Tables | Bitmap table | Bitmap | file name by default, file1.png]

33127 / BayMimic / The attribute value of the referenced bitmap is missing-> [Graphic | Graph. Tables | Bitmap table | Bitmap | file name for 'withdrawn open' state]

33128 / BayMimic / Multiple use of the same attribute value in the referenced bitmap-> [Graphic | Graph. Tables | Bitmap table | Bitmap | file name for 'withdrawn open' state, file4.png]

2.6.7.4 Memo bitmaps

A memo is a specific type of bitmap. They are used by Memo Icons.



- Only a Memo icon can reference a memo bitmap, and only this type.

64126 / Memo icon / The attribute value of the referenced bitmap is not valid

33126 / BayMimic / The attribute value of the referenced bitmap is not valid

Example :

64126 / Memo icon / The attribute value of the referenced bitmap is not valid-> [Graphic | Graph. Tables | Bitmap table | Bitmap | type, Single]

33126 / BayMimic / The attribute value of the referenced bitmap is not valid-> [Graphic | Graph. Tables | Bitmap table | Bitmap | type, Memo for OI client]

- In a Memo Bitmap, all referenced bitmaps must be filled

48127 / Bitmap / The attribute value of the referenced bitmap is missing

Example :

48127 / Bitmap / The attribute value of the referenced bitmap is missing-> [file name for 'no note' state]

- In a Memo Bitmap, all referenced bitmaps must have same size

48205 / Bitmap / The bitmap sizes are not equal (file 1, file 2)

Example :

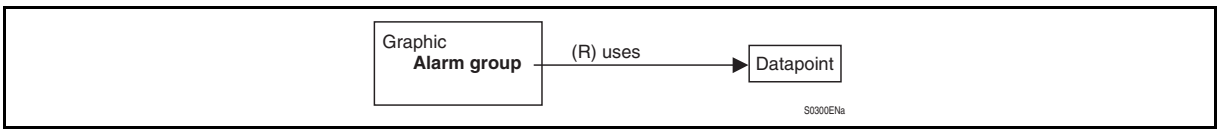
48205 / Bitmap / The bitmap sizes are not equal (file 1, file 2) -> [file name for 'no note' state = file1.png (16x16), file name for 'active' state = file2.png (8x16)]

2.6.7.5 Particular format for VarText symbol and VarText

For VarText symbol and VarText, the attribute 'particular format' (used at OI client level) should have the same value for the database languages.

06325 / *Attributevalue / The format should have the same value for all the database languages*

2.6.8 Alarm Groups



For an "Alarm Group", at least **1** relation "uses" must be linked.

50130 / AlarmGroup / At least one relation must be linked-> [uses]

For an "Alarm Group", data point used must be alarmed

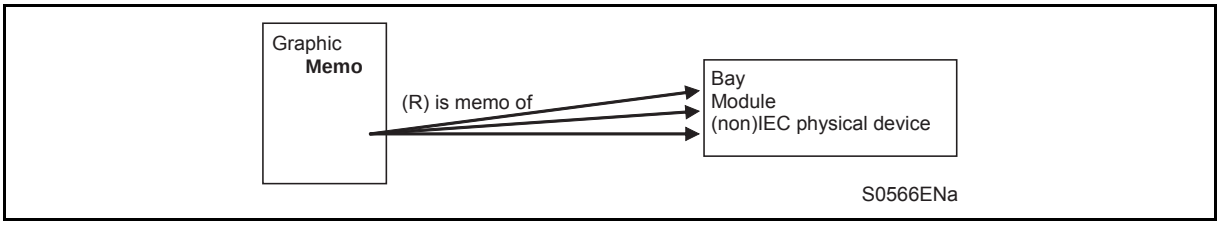
73265 / *AlarmGroup* / Data *point* used by alarm group is not alarmed-> [Graphic | ALR.GRP.NOT.OI]

2.6.9 User Profile

A User Profile can't be called "Administrator"

- *60181* / UserProfile / *User Profile name is not allowed (name) -> [name]3*

2.6.10 Memo



For each "Memo" : **1**, and only 1 relation "is memo of" must be linked.

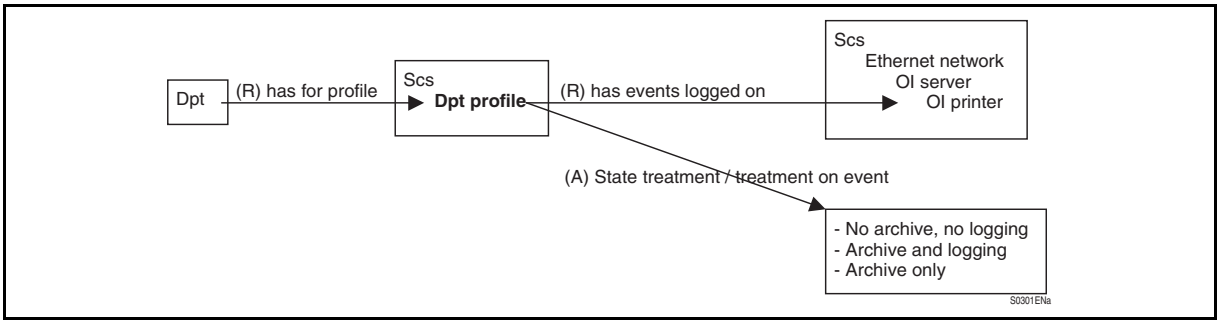
72130 / Memo / At least one relation must be linked-> [is memo of]

72113 / Memo / Multiple links-> [is memo of : …]

2.7 Datapoints checks

2.7.1 Datapoint Profiles

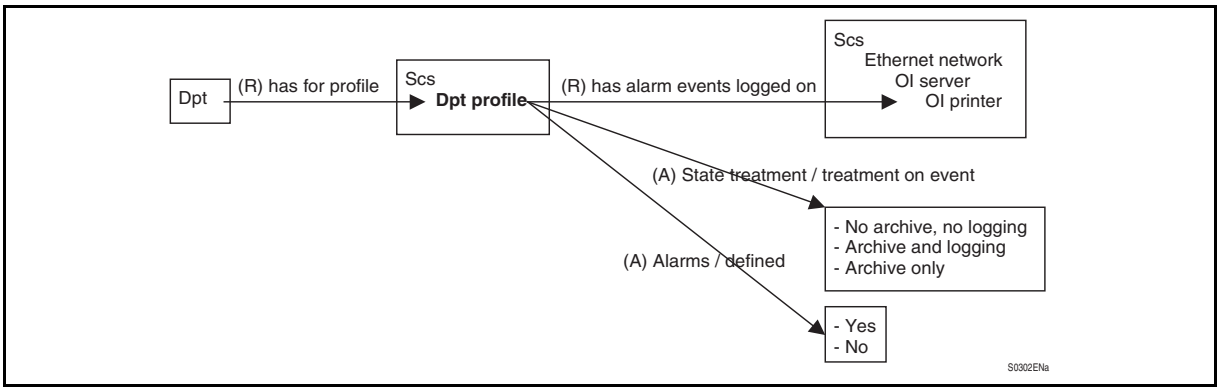
2.7.1.1 Events logging



If a Datapoint profile is linked to an OI or computer printer through the "has events logged on" relation, then its "treatment on event" attribute must be set to the " Logging for OI and/or computer" value.

In the case of profiles having several attributes "treatment on …", at least one of them must respect the rule.

23082 / DatapointProfile / The logging definition is not compatible with the relation-> [has events logged on: OI printer]



If a datapoint profile is linked to an "OI printer" through the "has alarm events logged on" relation, then:

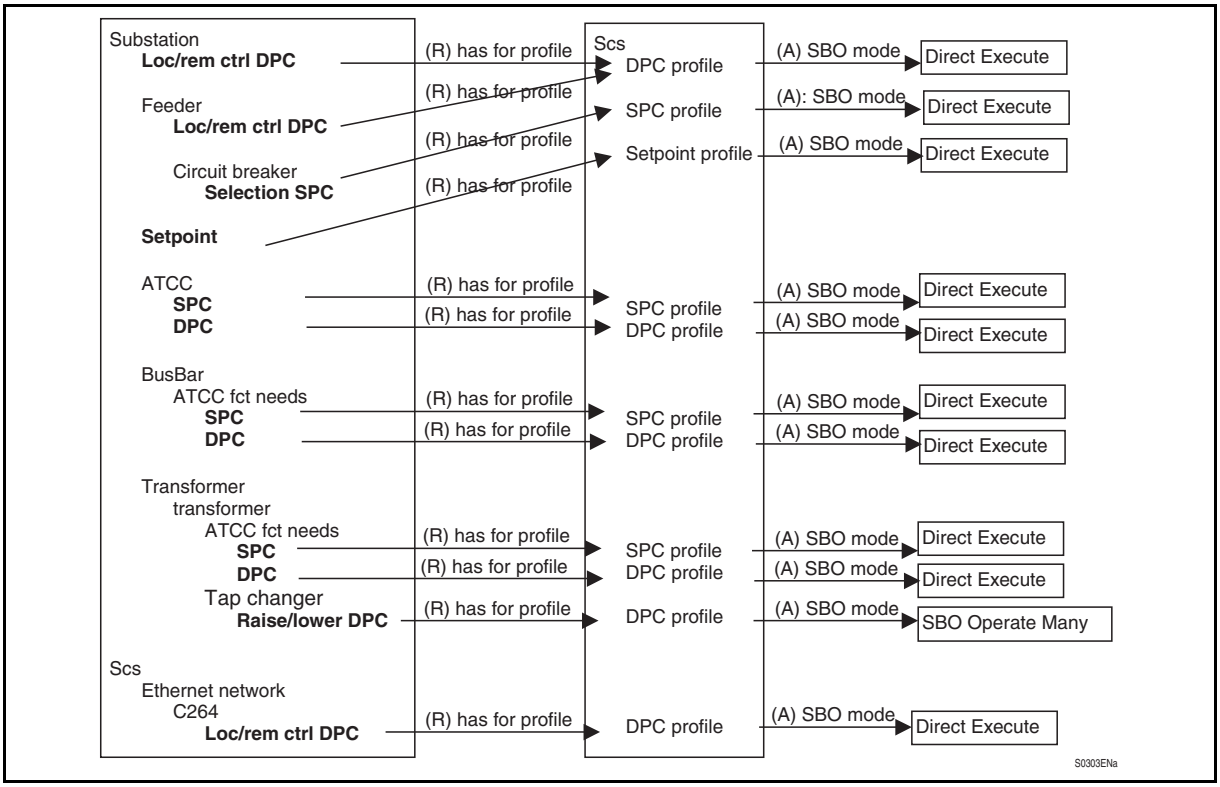
- it must respect previous rule
- its alarms "defined" attribute must be set to "Yes".

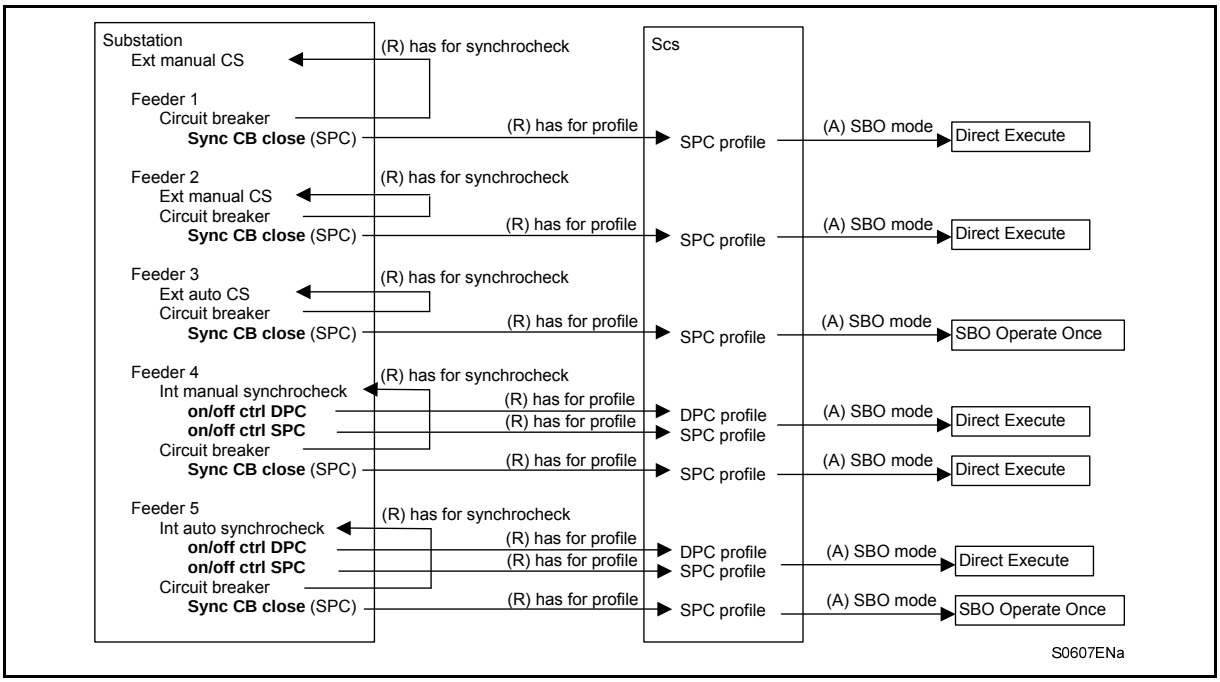
23082 / DatapointProfile / The logging definition is not compatible with the relation-> [has alarm events logged on: OI printer]

23083 / DatapointProfile / The alarm definition is not compatible with the relation-> [has alarm events logged on: OI printer]

2.7.1.2 SBO mode

- Profile per Datapoint type:





The possible values of the "SBO mode" attribute of the profile of a Datapoint are:

⇒ SBO Operate Many

⇒ SBO Operate Once

⇒ Direct Execute

⇒ Direct Execute with SBO popup

The following table shows the constraints on the value of the "SBO mode" attribute of the profile of a list of Datapoints:

Datapoints	"SBO mode" attribute value
"Raise/lower DPC" Datapoint	"SBO Operate Many": is allowed only for this Datapoint. It's forbidden for any other Datapoint.
"Loc/rem ctrl DPC" Datapoint of Substation, Bays, Computers	Allowed values are: "Direct Execute" Direct Execute with SBO popup
"Selection SPC" Datapoint of Circuit-breaker	Allowed values are: "Direct Execute" Direct Execute with SBO popup
SPC and DPC Datapoints of the "ATCC" function	Allowed values are: "Direct Execute" Direct Execute with SBO popup
SPC and DPC Datapoints of "ATCC fct needs" of BusBar and Transformers	Allowed values are: "Direct Execute" Direct Execute with SBO popup
Setpoint Datapoints which are wired on DO channels of Computer	Allowed values are: "Direct Execute" Direct Execute with SBO popup
"Sync CB close" Datapoint of a "Circuit breaker" linked to a "Ext manual CS" or "Int manual synchrocheck" synchrocheck built-in function	Allowed values are: "Direct Execute" Direct Execute with SBO popup
"Sync CB close" Datapoint of a "Circuit breaker" linked to a "Ext auto CS" or "Int auto synchrocheck built-in function	Allowed value is: "SBO Operate Once"
"on/off ctrl DPC" or "on/off ctrl SPC" Datapoint of an "Int synchrocheck" synchrocheck built-in function	Allowed values are: "Direct Execute" Direct Execute with SBO popup

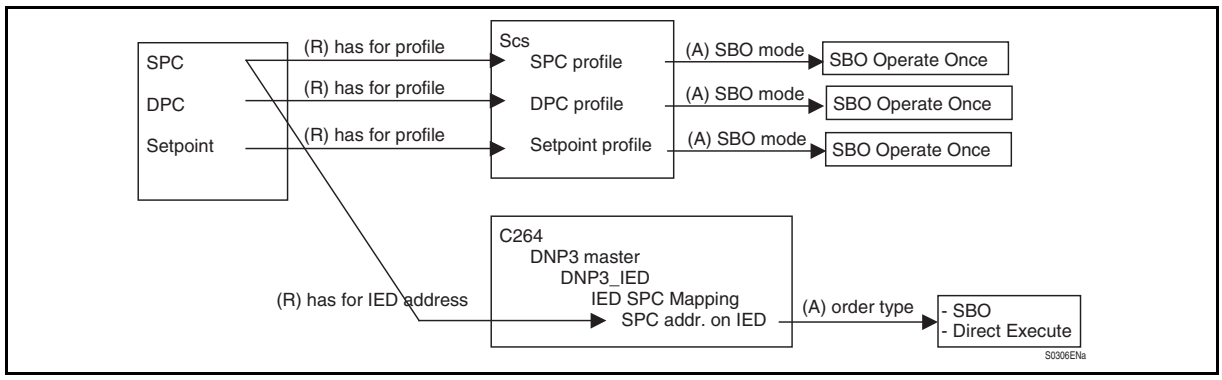
23065 / DatapointProfile / The attribute value of the profile is not valid (profile attribute)

Example:

23065 / DatapointProfile / The attribute value of the profile is not valid (profile attribute)-> [Scs | DPC profile | SBO mode, SBO Operate Many]

23065 / DatapointProfile / The attribute value of the profile is not valid (profile attribute)-> [Scs | SPC profile | SBO mode, SBO Operate Once]

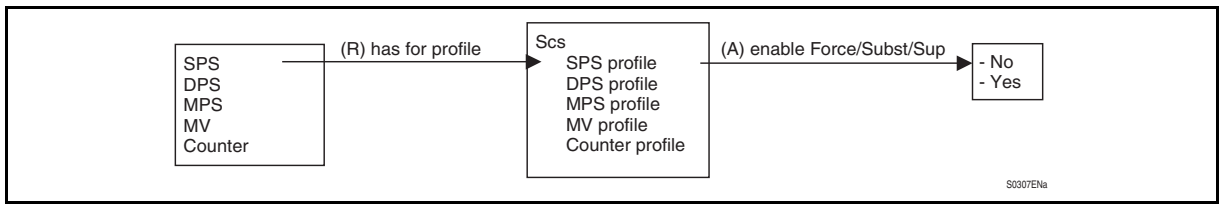
- Order type of IED address:



For each SPC, DPC or Setpoint datapoint linked to an IED address through the "has for IED address" relation: the "order type" attribute value of the IED address must match the "SBO mode" attribute value of the datapoint profile.

23086 / DatapointProfile / The attribute value does not match the datapoint profile (attribute, profile attribute)-> [order type = Direct execute, SBO mode = SBO Operate Once]

2.7.1.3 Forcing/Substition/Suppression enabling



The profile of a Datapoint of the System topology must have its "enable Force/Subst/Sup" set the "No" value.

23065 / DatapointProfile / The attribute value of the profile is not valid (profile attribute)

Example:

23065 / DatapointProfile / The attribute value of the profile is not valid (profile attribute)-> [Scs | SPS profile | enable Force/Subst/Sup, Yes]

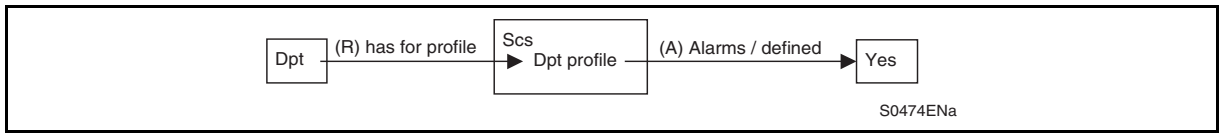
2.7.1.4 Alarming/Archiving/Logging/MeanValue Computation for non addressed datapoints

A datapoint which is not addressed can't be alarmed/archived/logged or computed by OI. Warn user if profile says other.

The datapoint non addressing possible causes are following:

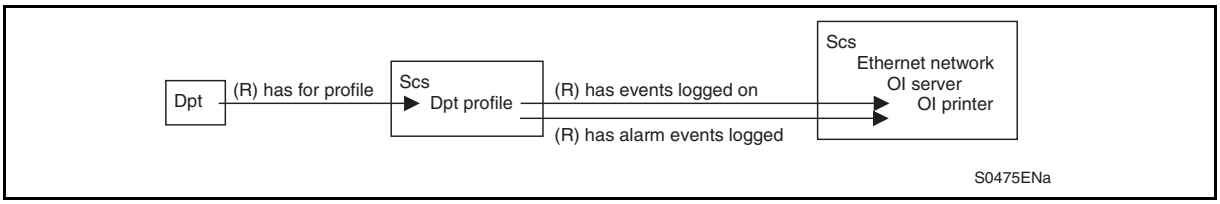
- IEC61850 address is not available for this kind of datapoint
- datapoint is out of scope of IEC61850 auto-addressing
- datapoint must be IEC61850 addressed

2.7.1.4.1 Alarmed Datapoints



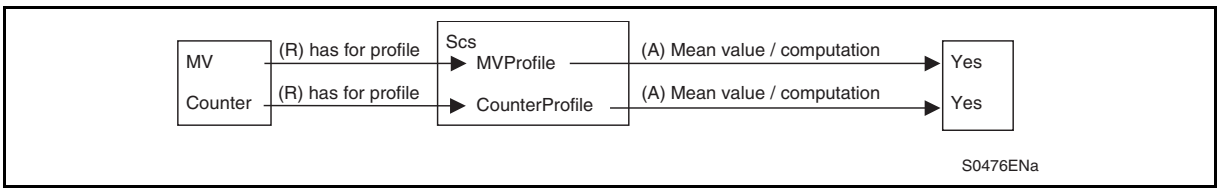
23172 / DatapointProfile / The Datapoint is alarmed in OI but has no IEC61850 address

2.7.1.4.2 Logged Datapoints



23173 / DatapointProfile / The Datapoint is logged in OI but has no IEC61850 address

2.7.1.4.3 Mean value computation Datapoint



23174 / DatapointProfile / The Datapoint has mean value computed by OI but has no IEC61850 address

2.7.1.4.4 Archived Datapoint

23175 / DatapointProfile / The Datapoint is archived in OI but has no IEC61850 address

2.7.1.5 Default format for MV and Counter profiles

For MV and counter format, the attribute ‘default format’ (used at OI client level) should have the same value for the database languages.

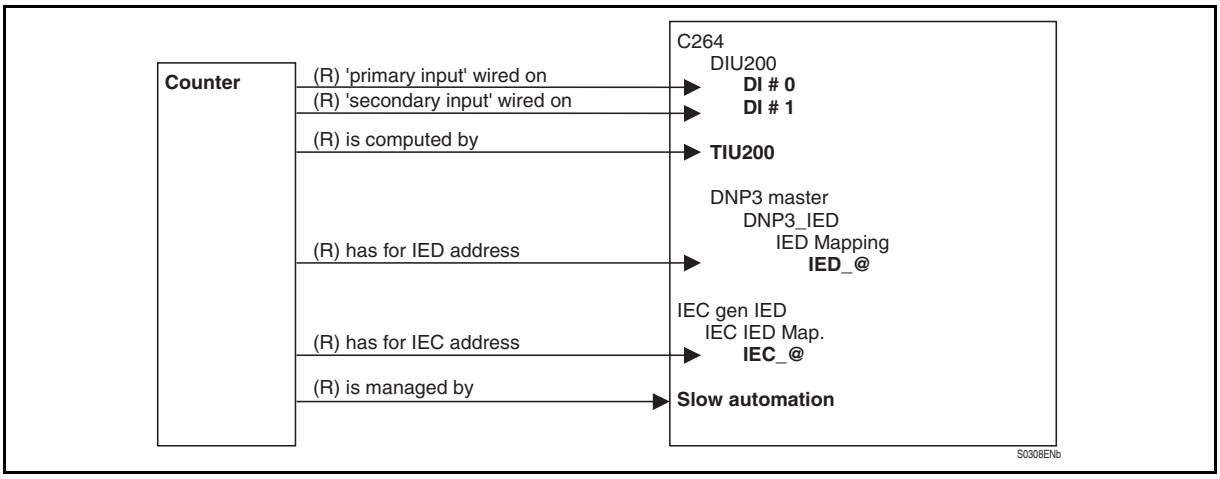
06325 / Attributevalue / *The format should have the same value for all the database languages*

2.7.2 Acquisition / Control Source definition

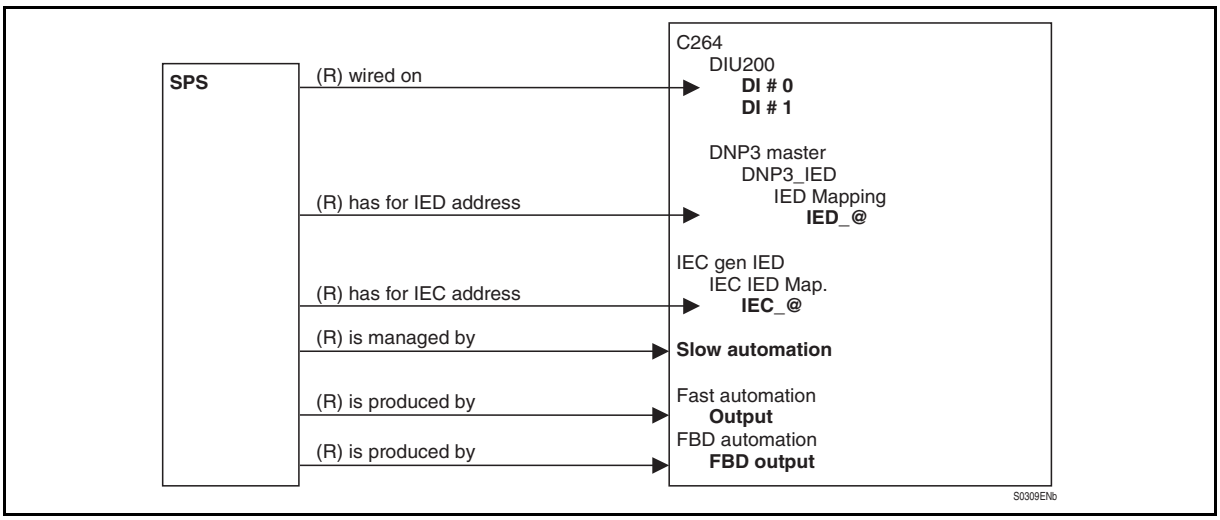
For a Datapoint, the Acquisition/Control source is defined through relations.

Prior to the checks definitions, the figures hereafter introduce those relations, per Datapoint type, as they are defined by the SCE Data Design.

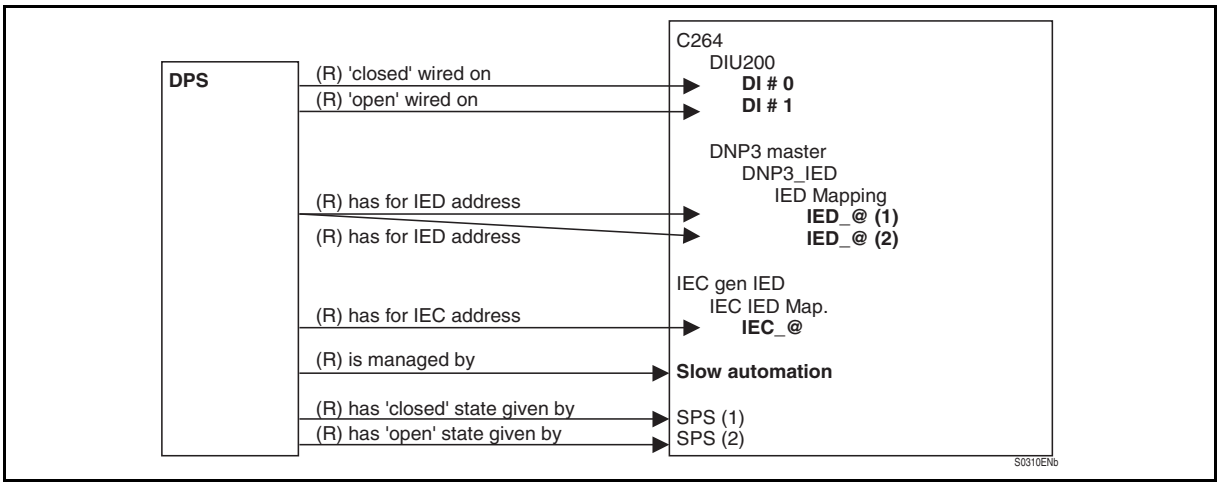
NOTE: If the Acquisition source is defined with the "is managed by" relation, then the Datapoint is considered as a "System" Datapoint.



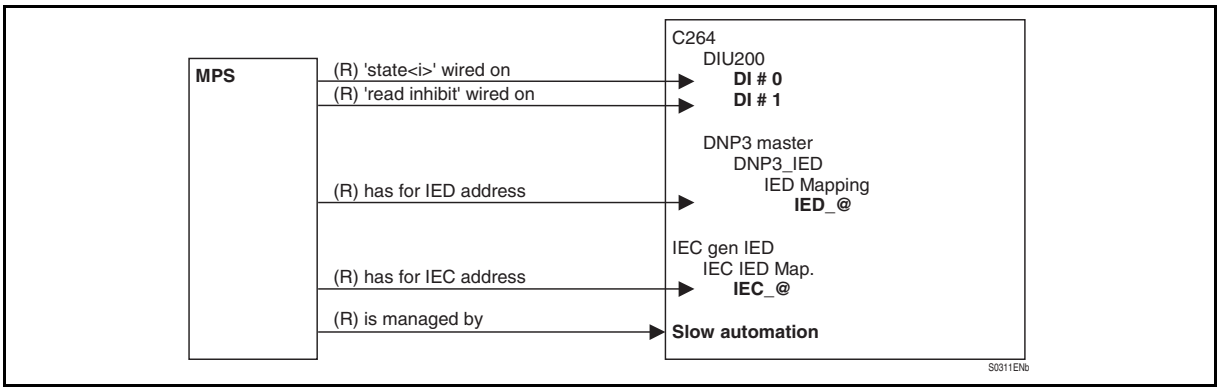
ACQUISITION CONTROL SOURCE DEFINITION - COUNTER



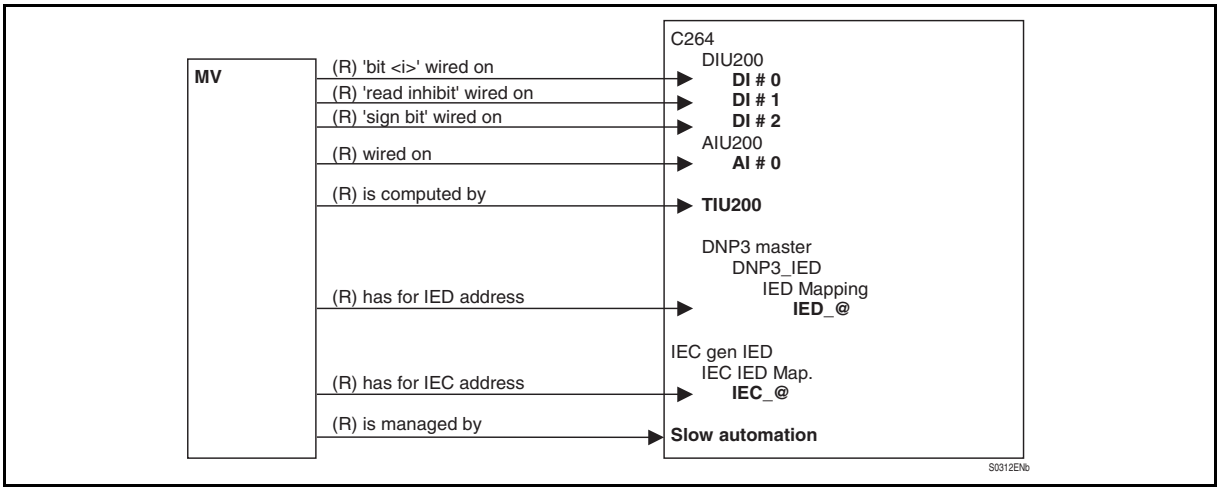
ACQUISITION CONTROL SOURCE DEFINITION - SPS



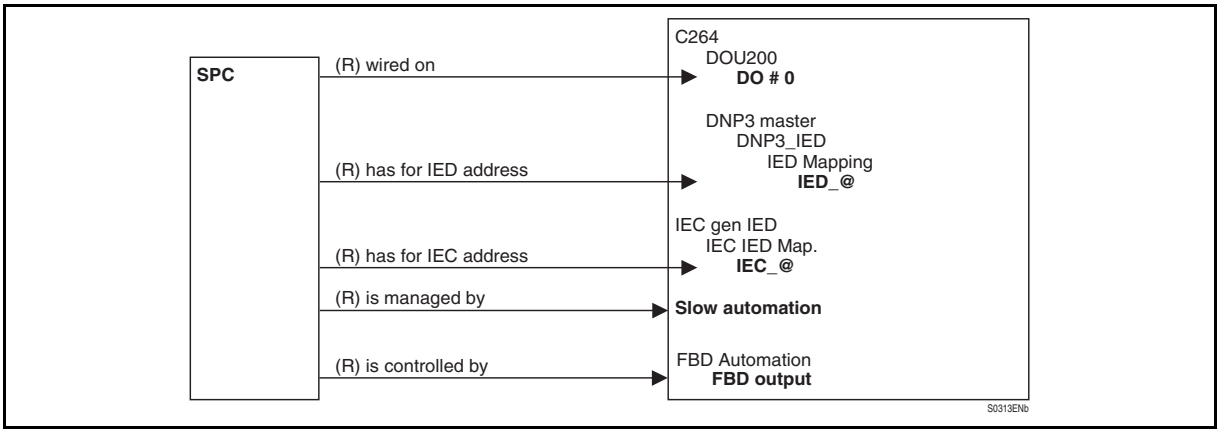
ACQUISITION CONTROL SOURCE DEFINITION - DPS



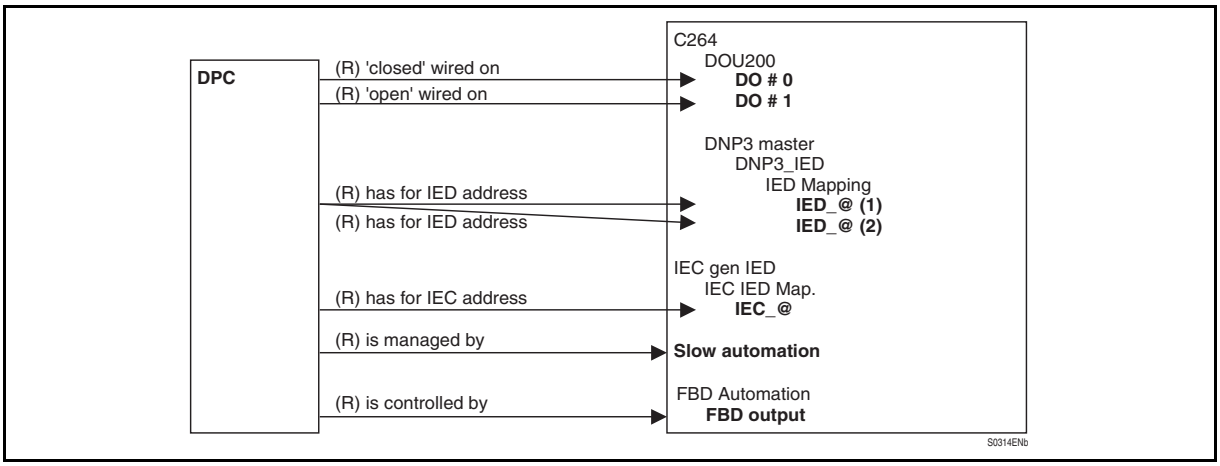
ACQUISITION CONTROL SOURCE DEFINITION - MPS



ACQUISITION CONTROL SOURCE DEFINITION - MV

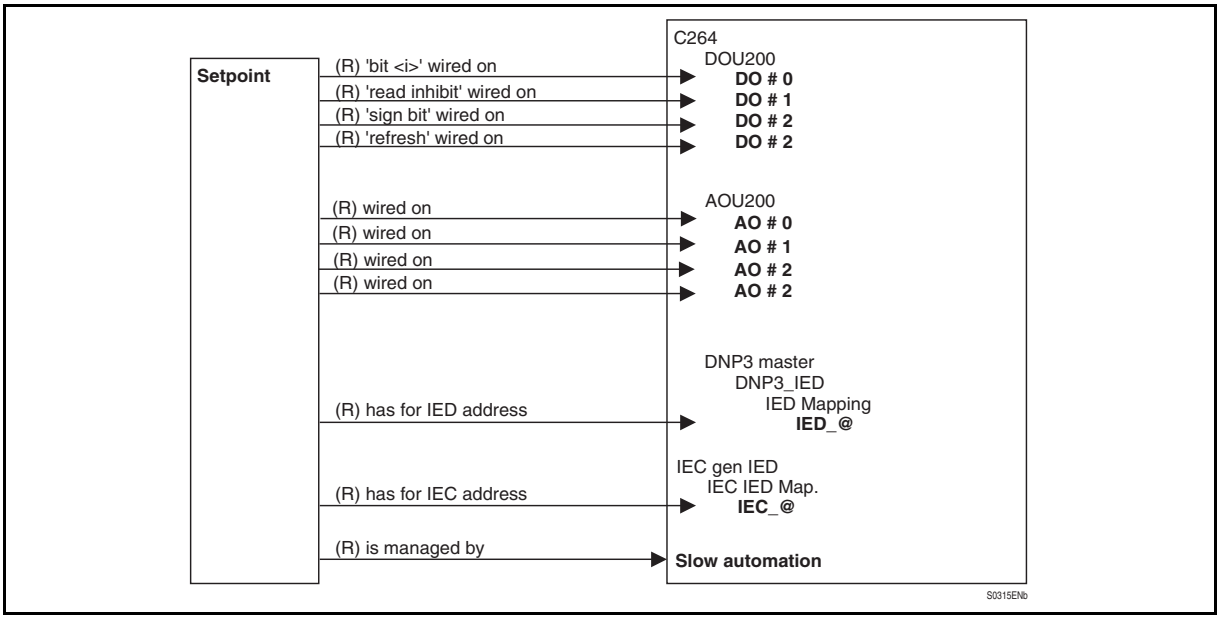


ACQUISITION CONTROL SOURCE DEFINITION - SPC

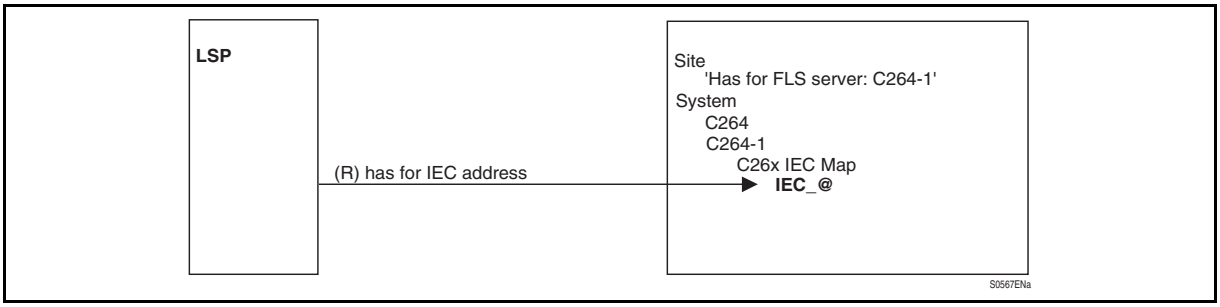


ACQUISITION CONTROL SOURCE DEFINITION - DPC

(*) up to 2 ‘closed’ wired on and 2 ‘open’ wired on relations can be set (i.e. up to 4 DO channels for the same DPC).



ACQUISITION CONTROL SOURCE DEFINITION - SETPOINT



The relation "has for IEC address" must be compatible with the "Ethernet network" protocol (IEC61850).

21114 / DatapointServer / The relation is not compatible with the Ethernet network protocol

Example, for an IEC Ethernet Network protocol:

21114 / DatapointServer / The relation is not compatible with the Ethernet network protocol-> [has for IEC address : ACDxST]

Only **1** Acquisition/Control source can be defined per Datapoint.

21043 / DatapointServer / Multiple control sources (server, relation)

21041 / DatapointServer / Multiple acquisition sources (server, relation)

Example:

21043 / DatapointServer / Multiple control sources (server, relation)-> [Scs | Ethernet network | C264, has for IED address : DPC addr. on IED]

A datapoint must be addressed on the MiCOM C264 which manages it.

i.e.: the automatic addressing generate addresses of a bay datapoint on the MiCOM C264 which manage the bay, but if the datapoint is produced by an automation which is managed by another MiCOM C264, there's a problem to determine which MiCOM C264 is server.

21045 / DatapointServer / The relation link is not compatible with the datapoint server

Example:

21043 / DatapointServer / The relation link is not compatible with the datapoint server -> [has for IED address : DPC addr. on IED]

- Counter Datapoint:

Only **1** relation "has for IEC address" is allowed. It must be compatible with the "Ethernet network" protocol (IEC61850).

27113 / EthernetAddressing / Multiple links

If the relation "secondary input wired on" is linked, then the relation "primary input wired on" must be linked too.

21062 / DatapointServer / 'primary input' is not wired

- MV Datapoint:

Only **1** relation "has for IEC address" is allowed. It must be compatible with the "Ethernet network" protocol (IEC61850).

27113 / EthernetAddressing / Multiple links

If the Acquisition Source is defined on DI channels then the Acquisition Source type is Digital, else it's Analog. The value (Analog or Digital) of the "type" attribute of the MV Datapoint must be compatible with the Acquisition Source type.

21070 / DatapointServer / The acquisition source is incompatible with the datapoint type

Example:

21070 / DatapointServer / The acquisition source is incompatible with the datapoint type-> [type, Analogue]

Several Bit relations are available : "bit<i> wired on", with i ∈ [00..63].

Among these relations, <i> values must be contiguous and start from 00.

If some of these relations are defined, then the relation "wired on" is forbidden, and vice versa (these two types of relations are incompatible acquisition sources).

21051 / DatapointServer / Wired bits are not contiguous

21041 / DatapointServer / Multiple acquisition sources (server, relation)

- DPC Datapoint:

Only **1** relation or "has for IEC address" is allowed. It must be compatible with the "Ethernet network" protocol (IEC61850).

27113 / EthernetAddressing / Multiple links

If the relation "open wired on" is linked, then the relation "closed wired on" must be linked too, and vice versa.

21055 / DatapointServer / 'open' is not wired on channel

21054 / DatapointServer / 'closed' is not wired on channel

A "DPC" Datapoint can have up to 2 relations "has for IED address". In the case of 2 relations, they are considered as only 1 Control Source definition.

When a DPC is wired on DO channels, all concerned channels must belong to the same board.

<21158> / DatapointServer / 'open' and 'closed' are not wired on the same board

If the relation "open wired on" is double-linked, then the relation "closed wired on" must be double-linked too, and vice versa.

<21137> / DatapointServer / 'open' is not double-wired on DO channels

<21138> / DatapointServer / 'closed' is not double-wired on DO channels

- SPS Datapoint:

Only **1** relation "has for IEC address" is allowed. It must be compatible with the "Ethernet network" protocol (IEC61850).

27113 / EthernetAddressing / Multiple links

- DPS Datapoint:

Only **1** relation "has for IEC address" is allowed. It must be compatible with the "Ethernet network" protocol (IEC61850).

27113 / EthernetAddressing / Multiple links

If the relation "open wired on" is linked, then the relation "closed wired on" must be linked too, and vice versa.

21055 / DatapointServer / 'open' is not wired on channel

21054 / DatapointServer / 'closed' is not wired on channel

If the relation "has open state given by" is linked, then the relation "has closed state given by" must be linked too, and vice versa. The two links must be different.

21057 / DatapointServer / 'open' state is missing

21056 / DatapointServer / 'closed' state is missing

21058 / DatapointServer / 'open' and 'closed' states are linked to the same datapoint

A "DPS" Datapoint can have up to 2 relations "has for IED address". In the case of 2 relations, they are considered as only 1 Acquisition Source definition.

- MPS Datapoint:

Only **1** relation "has for IEC address" is allowed. It must be compatible with the "Ethernet network" protocol (IEC61850).

27113 / EthernetAddressing / Multiple links

Several State relations are available : "state<i> wired on", with i ∈ [00..15].

Among these relations, <i> values must be contiguous and start from 00.

21052 / DatapointServer / Wired states are not contiguous

- Setpoint Datapoint:

Only **1** relation "has for IEC address" is allowed. It must be compatible with the "Ethernet network" protocol (IEC61850).

27113 / EthernetAddressing / Multiple links

Several Bit relations are available : "bit<i> wired on", with i ∈ [00..47].

Among these relations, <i> values must be contiguous and start from 00.

21051 / DatapointServer / Wired bits are not contiguous

If the Acquisition Source is defined on DI channels then the Acquisition Source type is Digital, else it's Analog. The value (Analog or Digital) of the "type" attribute of the Setpoint Datapoint must be compatible with the Acquisition Source type.

21070 / DatapointServer / The acquisition source is incompatible with the datapoint type

Example :

21070 / DatapointServer / The acquisition source is incompatible with the datapoint type-> [type, Analogue]

- LSP Datapoint:

For LSP datapoint, the server datapoint must be the same than the FLS server defined at site level by relation ‘Has for FLS server’.

21045 / DatapointServer / The relation link is not compatible with the datapoint server

2.7.3 Client / Server definition

For a Datapoint, the Server and Clients identification is based on general rules (see § 2.7.3.1 General definitions) which can be overwritten by specific rules depending of the Datapoint type (see § 2.7.3.2 Detailed definitions).

These definitions are based on the SCE Data Design.

2.7.3.1 General definitions

For a Datapoint, **1**, and only 1, **Server** device must be defined.

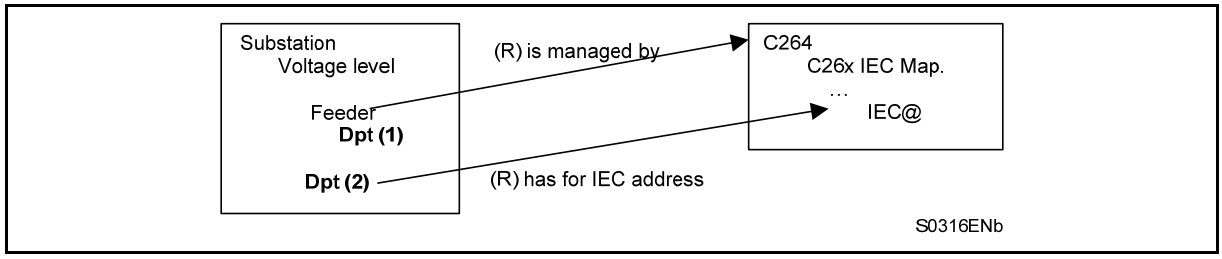
21047 / DatapointServer / The server is missing

21040 / DatapointServer / The server is not unique (server, relation)

Example:

21040 / DatapointServer / The server is not unique (server, relation)-> [Scs | Ethernet network | C264, has for IED address: DPC addr. on IED]

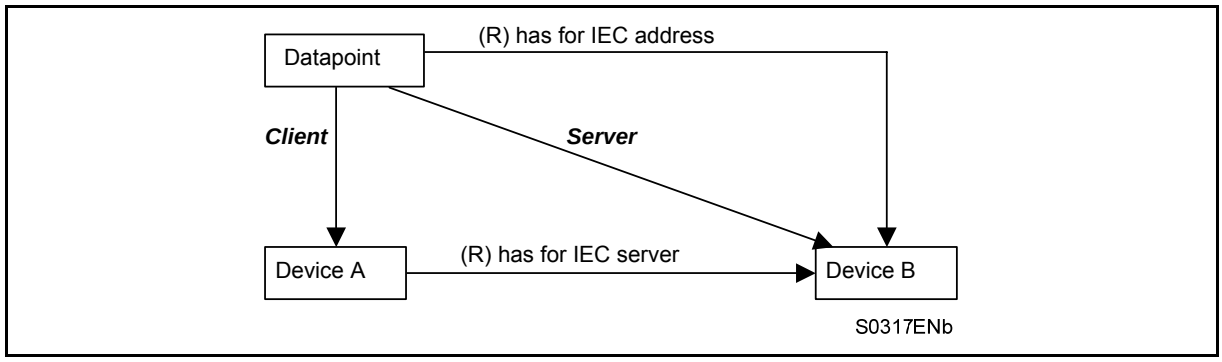
Special case:



For a Datapoint having no Server explicitly defined, then:

- if the Datapoint is located under a Bay, the device managing the Bay is automatically considered as the Server ("is managed by" relation link).
- if the Datapoint is located above a Bay, the device managing the associated voltage level, substation or site (via has for default server relation set at the corresponding level) is automatically considered as the Server except if it has an IEC address on a specific server.

A device is **Client** of a Datapoint, if, and only if, it's not **Server** of this Datapoint.



- A Datapoint must be linked to an address, in the mapping of its Server device, with the "has for IEC address" relation.

This, if:

- the Datapoint has at least 1 Client device
- the relation is available for the Datapoint type (i.e., it's defined by the Structural Database rules).

- A device, Client of a Datapoint, must be linked to the Server of the Datapoint through the "has for IEC server" relation.

21046 / DatapointServer / The datapoint is not linked to an address of the server (server)

22048 / DatapointClient / The client-server relation is missing (server, client)

Example:

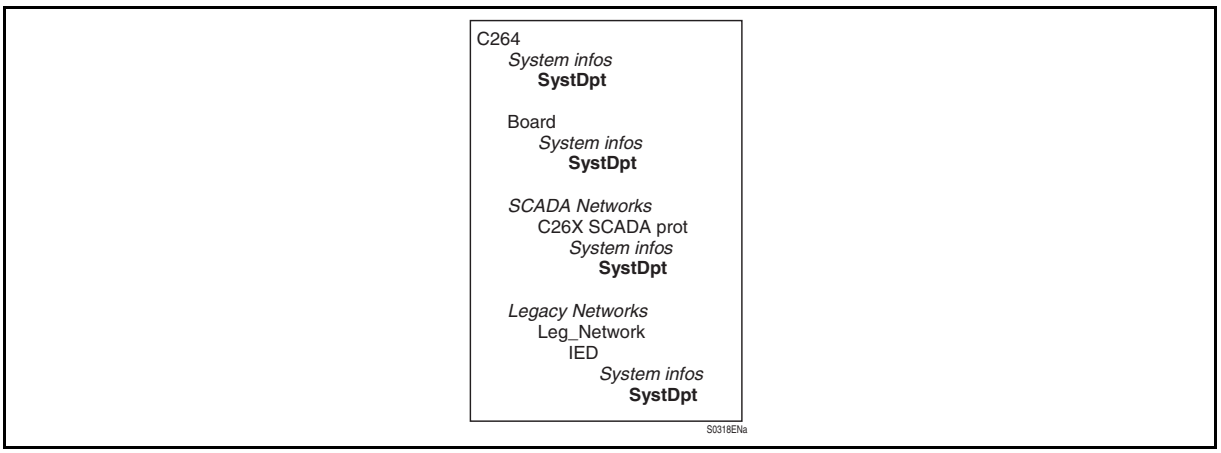
21046 / DatapointServer / The datapoint is not linked to an address of the server (server)-> [Scs | Ethernet network | C264]

22048 / DatapointClient / The client-server relation is missing (server, client)-> [Scs | Ethernet network | C264, Scs | Ethernet network | OI server]

2.7.3.2 Detailed definitions

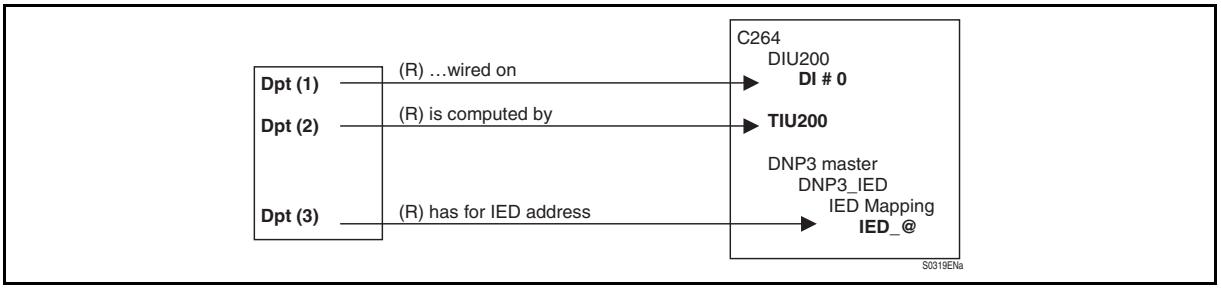
2.7.3.2.1 Computer

2.7.3.2.1.1 System Datapoints



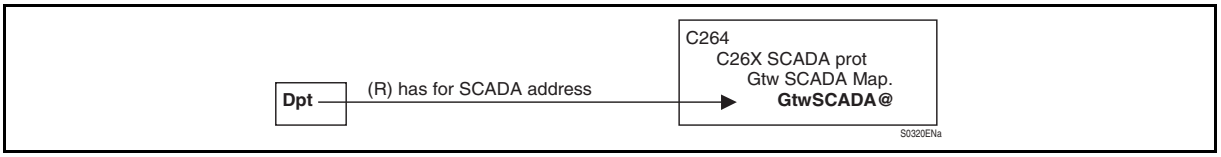
The Computer "C264" is **Server** of each System Datapoint "SystDpt".

2.7.3.2.1.2 Acquisition/Control Sources



The Computer "C264" is **Server** of each Datapoint "Dpt(1)", "Dpt(2)", "Dpt(3)".

2.7.3.2.1.3 SCADA address

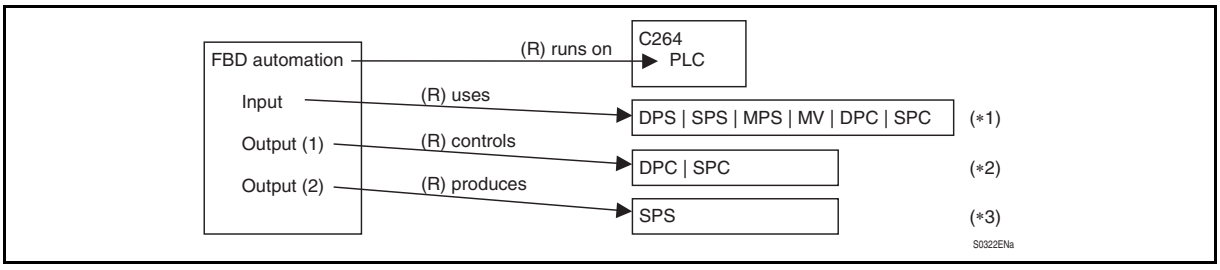


The Computer "C264" is **Client** of the Datapoint "Dpt".

Moreover, a C264 which supports gateway function must receive information through reports: it cannot have a relation "goose only" with other C264 which provides it these information.

22193 / DatapointClient / The report usage for client-server relation is missing for gateway or grouping at client level (server, client)

2.7.3.2.1.4 FBD automation

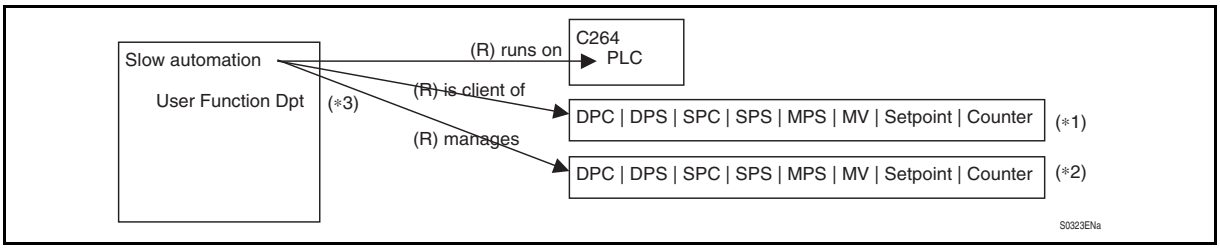


The Computer "C264" is **Client** of the used Datapoints (*1).

The Computer "C264" is **Server** of the controlled Datapoints (*2).

The Computer "C264" is **Server** of the produced Datapoint (*3)".

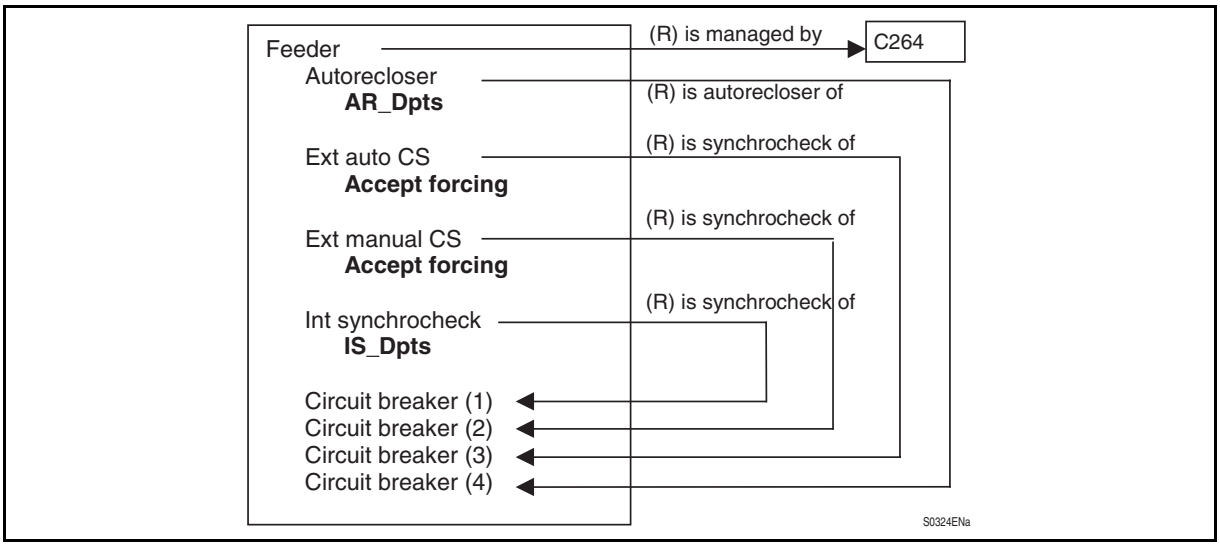
2.7.3.2.1.5 Slow automation



The Computer "C264" is **Server** of the "Slow automation" Datapoints (*3) and of the managed Datapoints (*2).

The Computer "C264" is **Client** of the used Datapoints (*1).

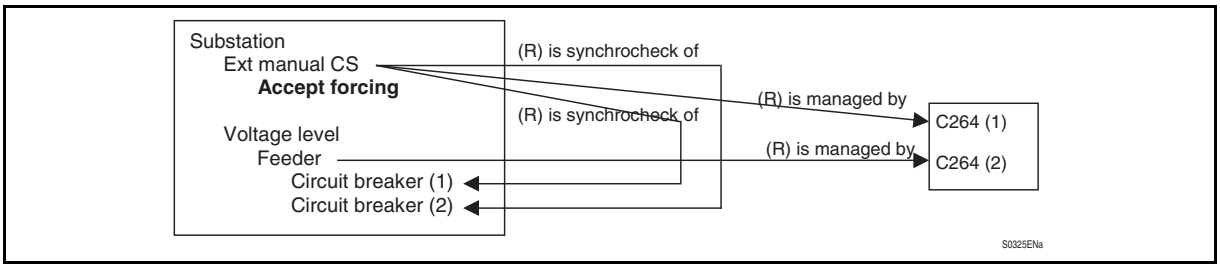
2.7.3.2.1.6 Bay Built-in functions



The Computer "C264" is the manager of the Bay containing the Circuit-breakers, therefore it's the **Server** of the Datapoints belonging to each Built-in function: "Autorecloser", "Ext auto CS", "Ext manual CS" and "Int synchrocheck".

If, for a Built-in function Datapoint, another Server is explicitly defined, then the Computer "C264" is **Client** of this Datapoint.

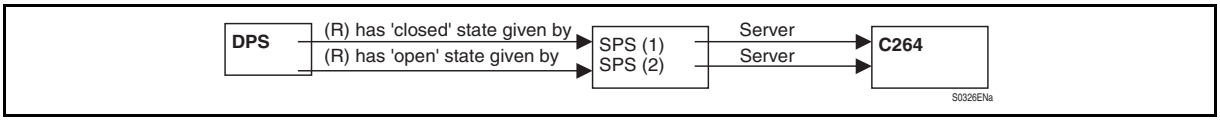
2.7.3.2.1.7 Substation Built-in function



The Computer "C264(1)" is the manager of the Built-in function "Ext manual CS", therefore it's the **Server** of the Datapoints belonging to this Built-in function.

The Computer "C264(2)" is the manager of the Bay containing the Circuit-breakers, therefore it's the **Client** of the Datapoints belonging to the Built-in function "Ext manual CS".

2.7.3.2.1.8 DPS-SPS association



The Computer "C264" is the Server of "SPS(1)" and "SPS(2)" Datapoints, therefore it's also the **Server** of the "DPS" Datapoint.

For this, both "SPS(1)" and "SPS(2)" Datapoints must have the same Server device.

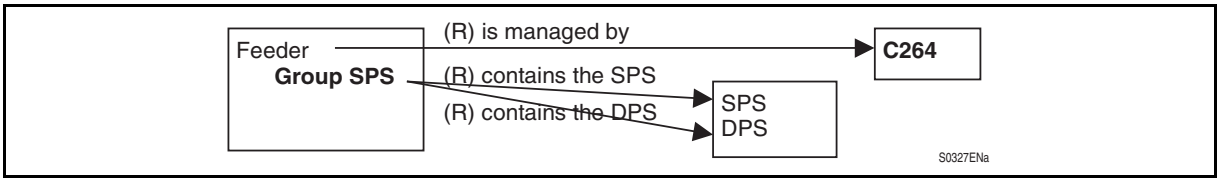
21040 / DatapointServer / The server is not unique (server, relation)

Examples (from the DPS point of view):

21040 / DatapointServer / The server is not unique (server, relation)-> [Scs | Ethernet network | C264, has 'closed' state given by: SPS(1)]

21040 / DatapointServer / The server is not unique (server, relation)-> [Scs | Ethernet network | C264(2), has 'open' state given by: VoltageLevel SPS(2)]

2.7.3.2.1.9 Group SPS

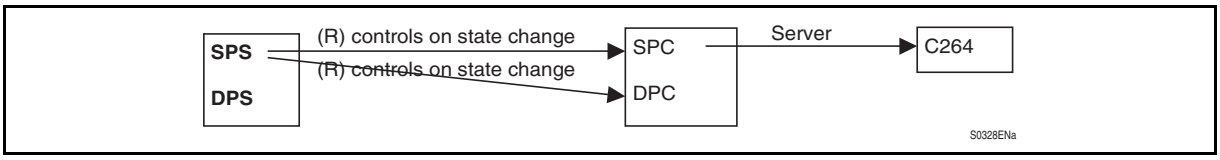


The Computer "C264" is the **Server** of the "Group SPS" Datapoint, and it's **Client** of the two Datapoints "SPS" and "DPS".

Moreover, a C264 which supports grouping function with inputs from other computers must receive these inputs through reports: it cannot have a relation "goose only" with other C264 which provides it these information.

22193 / DatapointClient / The report usage for client-server relation is missing for gateway or grouping at client level (server, client)

2.7.3.2.1.10 State Change



A "SPS" (or "DPS") Datapoint can be linked to a "SPC" (or "DPC") Datapoints through relations "controls on state change".

The Server of the "SPC" (or "DPC") Datapoint is **Client** of the "SPS" (or "DPS") Datapoint.

NOTE: An "SPC" (or "DPC") Datapoint can be the link of **1**, and only 1 "controls on state change" relation.

15113 / RelationControlsOnStateChange / Multiple links

Examples (from the DPS point of view):

15113 / RelationControlsOnStateChange / Multiple links-> [is controlled on state change of: Substation SPS]

15113 / RelationControlsOnStateChange / Multiple links-> [is controlled on state change of: Substation DPS]

An xPC must be controlled only one time by same xPS

15248 / RelationControlsOnStateChange / The xPC is controlled by an xPS more than one time (mutliple link with same xPS) (linked xPS)

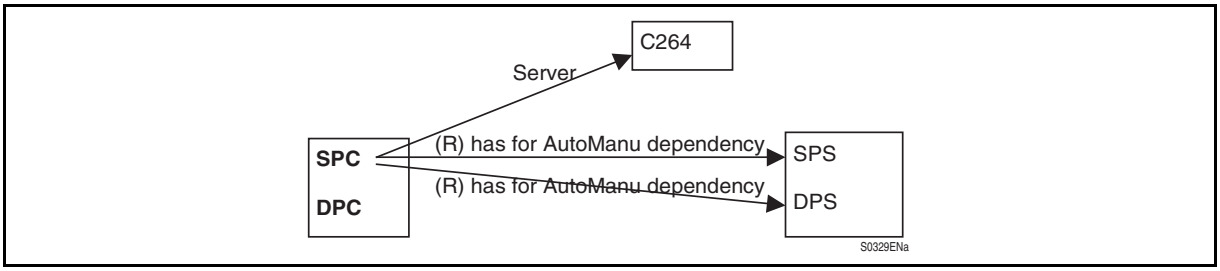
A controlled xPC by an xPS can not be mapped on legacy IED

15044 / RelationControlsOnStateChange / Therelation types are not compatible [is control on state change of, has for IED address]

A controlled xPC by an xPS must be wired

15305 / RelationControlsOnStateChange / The use of a relation 'controls on state change' for xPC not wired is not authorized.

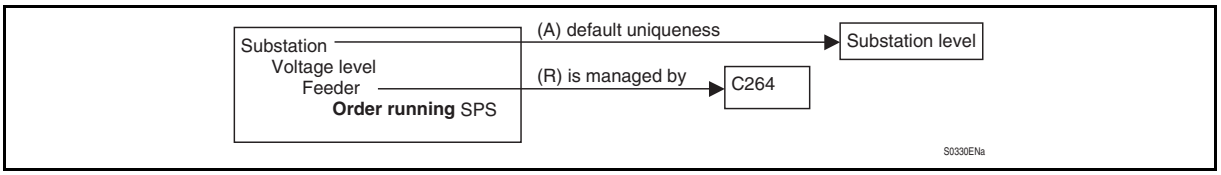
2.7.3.2.1.11 Auto/Manu dependency



A "SPC" (or "DPC") Datapoint can be linked to a "SPS" (or "DPS") Datapoint through relation the "has for AutoManu dependency".

The Server of the "SPC" Datapoint is **Client** of the "SPS" and "DPS" Datapoints.

2.7.3.2.1.12 Order running



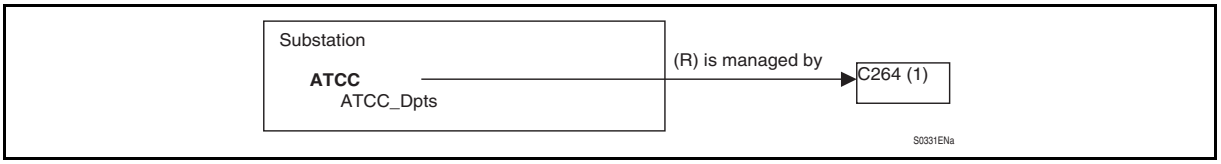
The Computer "C264" is the **Server** of the "Order running" SPS Datapoint.

If the attribute "default uniqueness" of the "Substation" is set to the "Substation level" value, then all the computers are **Clients** of the "Order running" SPS Datapoint.

2.7.3.2.1.13 ATCC function

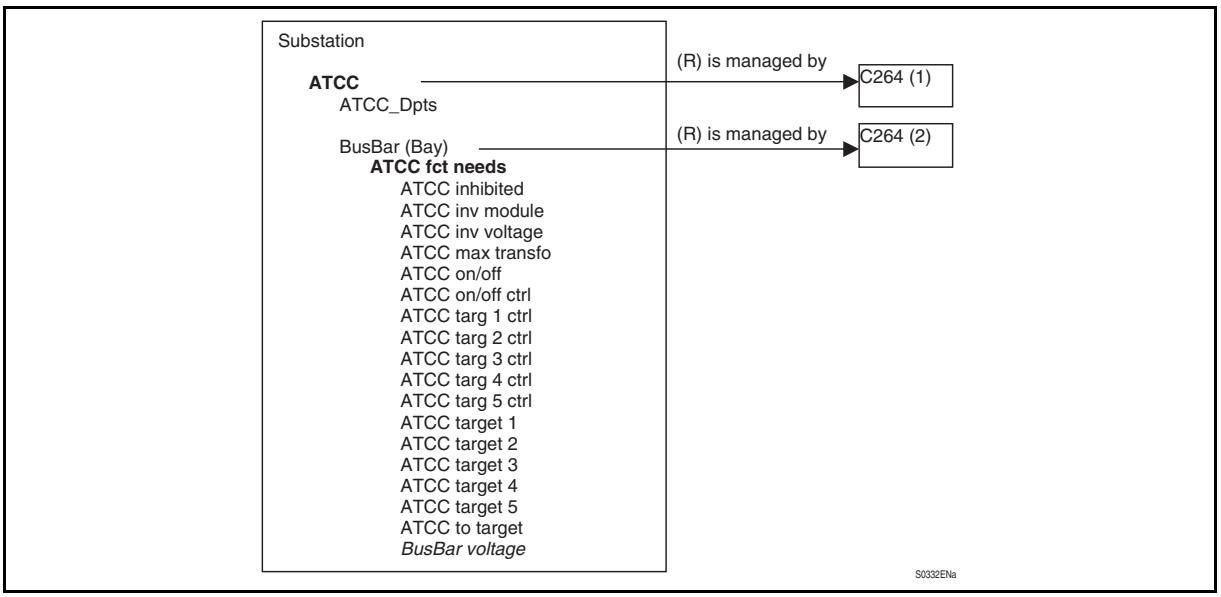
NOTE: hereafter, the term "wired" for a Datapoint means that the Datapoint has one of the following relations: "…wired on", "has for IED address", or "has for IEC address" to an IEC generic IED.

Main ATCC:



The Computer "C264(1)", managing the main "ATCC", is the **Server** of all the Datapoints of this latter ("ATCC_Dpts").

BusBar ATCC function:



In the case of all the Datapoints of the "ATCC fct needs", except the "BusBar voltage" Datapoint:

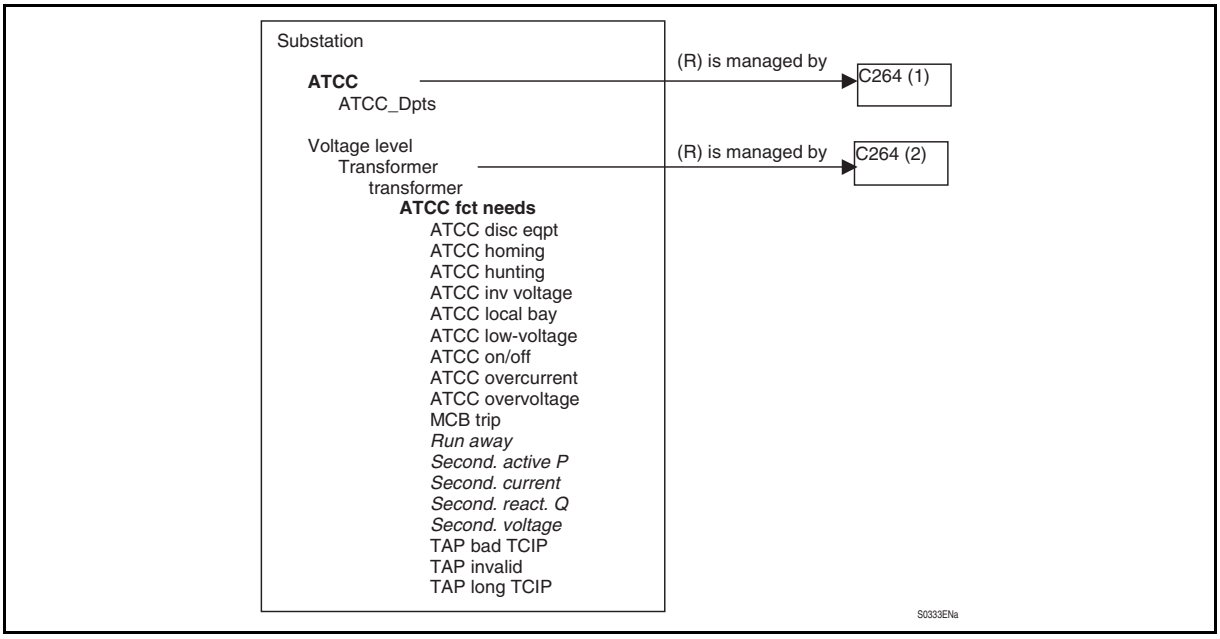
⇒ they cannot be wired. As a result, the computer "C264(1)", managing the main "ATCC", is their **Server**.

In the case of the "BusBar voltage" Datapoint:

⇒ if it's not wired then, the computer "C264(1)", managing the main "ATCC", is its **Server**.

⇒ if it's wired then, the computer "C264(2)", managing the BusBar bay, is its **Server** and the computer "C264(1)", managing the main "ATCC", is its **Client**.

Transformer ATCC function:



In the case of all the Datapoints of the "ATCC fct needs", except the "Run away", "Second. active P", "Second. current", "Second. react. Q", "Second. voltage" Datapoints:

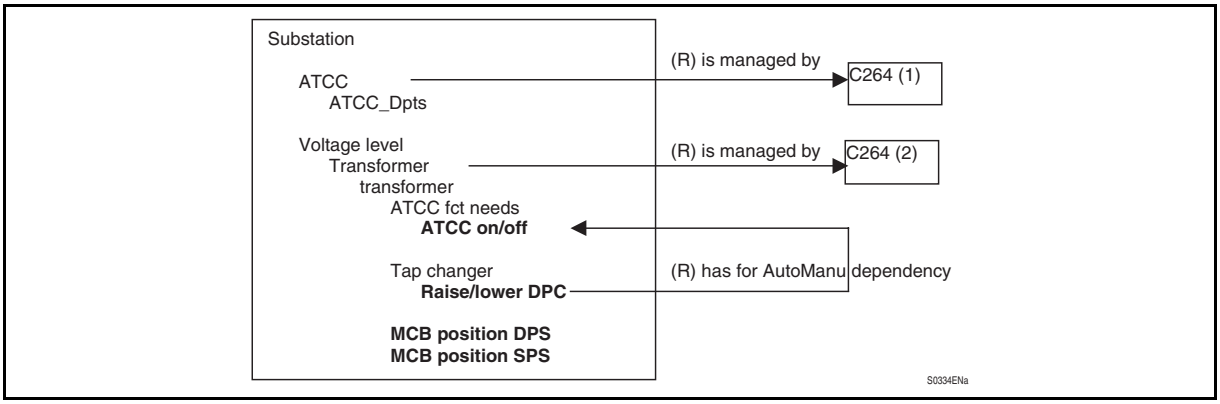
⇒ they cannot be wired. As a result, the computer "C264(1)", managing the main "ATCC", is their **Server**.

In the case of the "Run away" Datapoint:

⇒ it cannot be wired. But, the computer "C264(2)", managing the Transformer bay, is its **Server** and the computer "C264(1)", managing the main "ATCC", is its **Client**.

In the case of the "Second. active P", "Second. current", "Second. react. Q", "Second. voltage" Datapoints:

⇒ they can be wired or not. If wired, the computer "C264(2)", managing the Transformer bay, is their **Server** and the computer "C264(1)", managing the main "ATCC", is their **Client**. If not wired, the computer "C264(1)" managing the main "ATCC", is their **Server.**



Case of the "Raise/lower DPC" Datapoint:

⇒ if it's present then, the "ATCC on/off" Datapoint must be linked to it through the relation "has for AutoManu dependency".

26031 / ATCC / The link to AutoMany dependency is missing

Case of "MCB position DPS" and "MCB position SPS" Datapoints:

⇒ they are mutually exclusive.

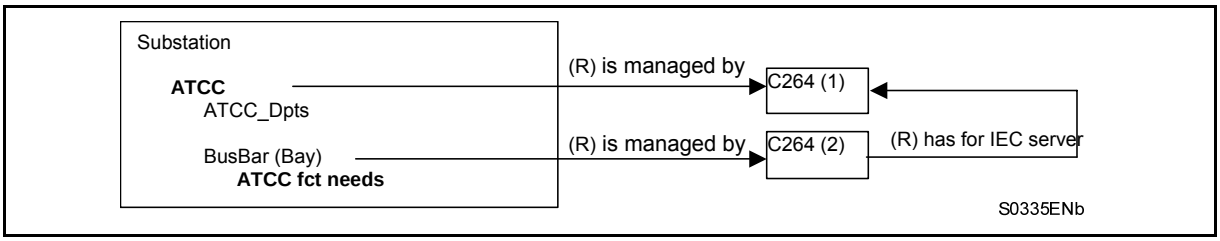
⇒ they must be wired.

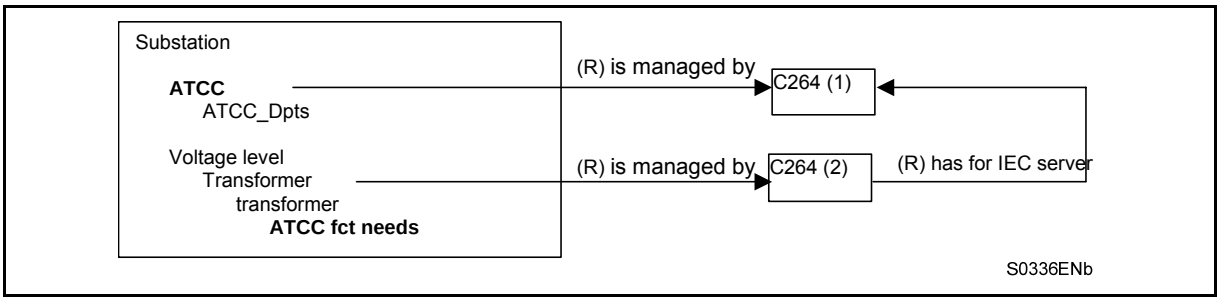
⇒ The computer "C264(2)", managing the Transformer bay, is their **Server** and the computer "C264(1)", managing the main "ATCC", is their **Client**.

26066 / ATCC / The datapoints are not compatible-> [MCB position DPS, MCB position SPS]

21042 / DatapointServer / The acquisition source is missing

IEC servers:



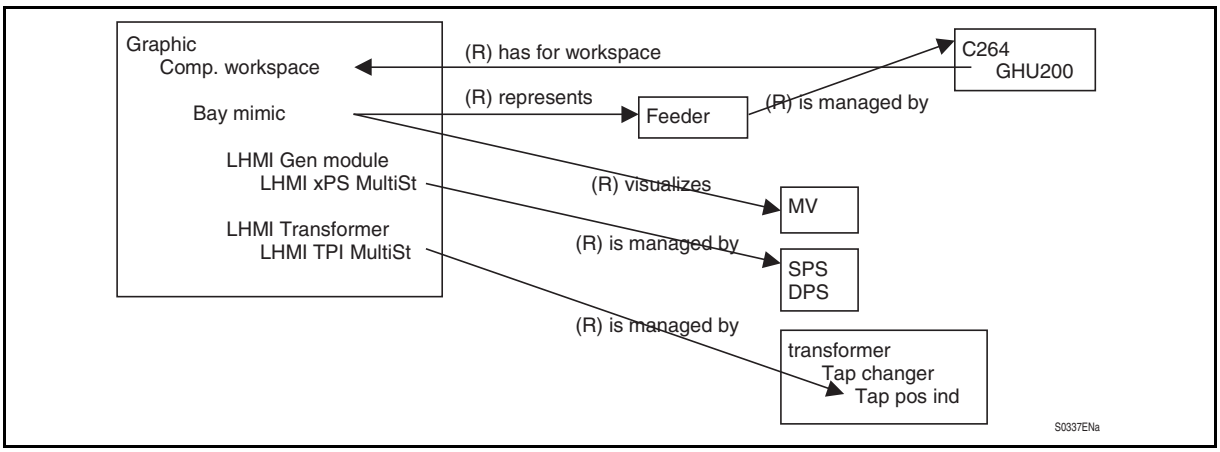


The computer "C264(2)", managing the BusBar or Transformer bay, must be linked to the computer "C264(1)", managing the main "ATCC", through the relation "has for IEC server". Moreover the link must at least use report mode.

22048 / DatapointClient / The client-server relation is missing (server, client)-> [Scs | Ethernet network | C264(1), Scs | Ethernet network | C264(2)]

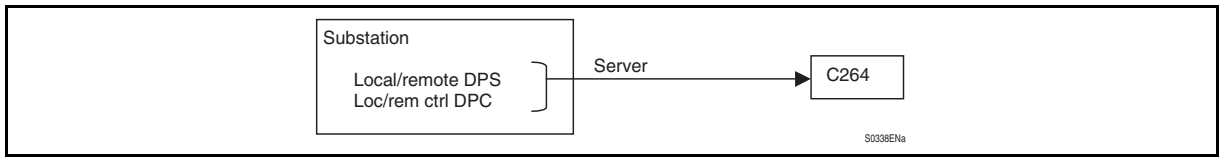
22192 / DatapointClient / The report usage for client-server relation is missing for ATCC at client level (server, client)

2.7.3.2.1.14 LHMI



The Computer "C264" is the **Server** of the Datapoints: "MV", "SPS or DPS", "Tap pos ind".

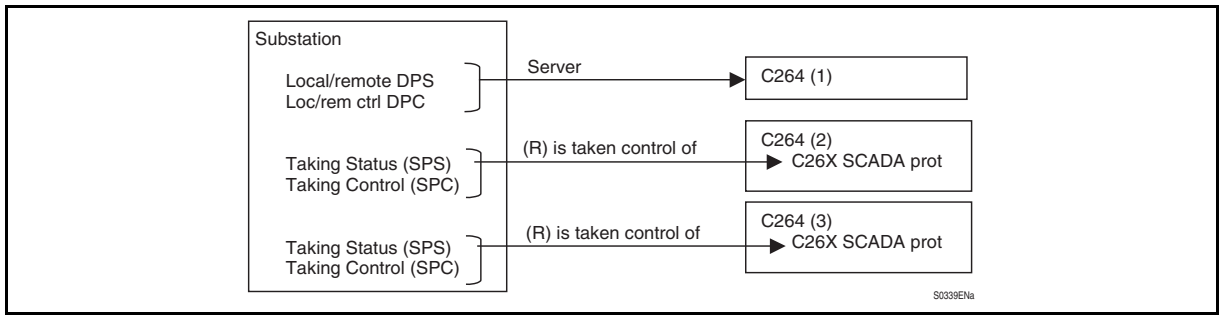
2.7.3.2.1.15 Local/Remote



If the two Datapoints "Local/remote DPS" and "Loc/rem ctrl DPC" are present, they must have the same Server device.

24063 / Datapoint_LocalRemote / The Local/Remote datapoints have not the same server (servers)

2.7.3.2.1.16 Taking-Control function



If a Taking-Control function is defined then, the "Loc/rem ctrl DPC" must be present.

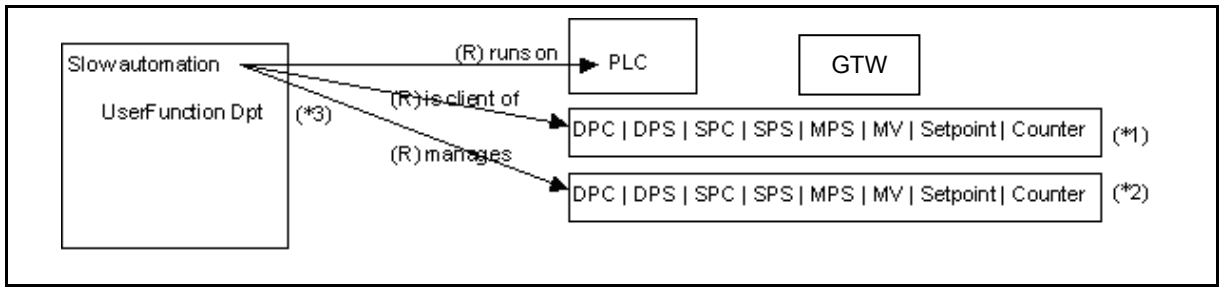
52089 / TakingControl / The datapoint is missing-> [Loc/rem ctrl DPC]

The Server of the Local/Remote Datapoints ("C264(1)") is the **Server** of each Datapoints couple "Taking Status" / "Taking Control".

All the devices ("C264(2), C264(3)") having a SCADA network linked to a Taking-Control function are:

- **Clients** of each Datapoints couple "Taking Status" / "Taking Control".
- **Clients** of the Datapoints couple "Local/remote DPS" / "Loc/rem ctrl DPC".

2.7.3.2.1.17 RT automation

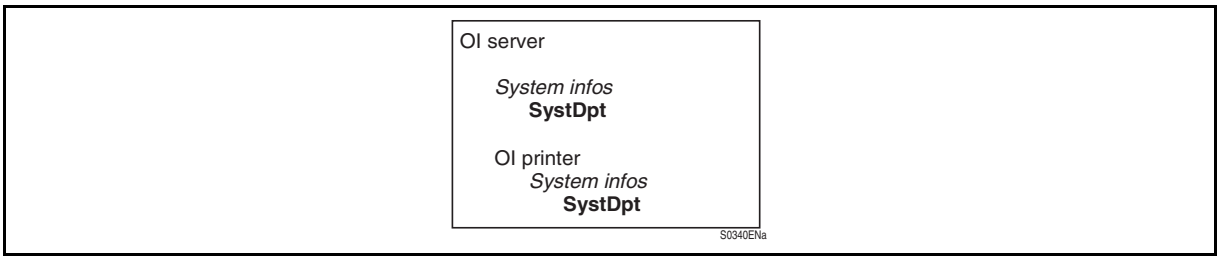

Slow automation
UserFunction Dpt
(*3)
(R) runs on
PLC
GTW
(R) is client of
(R) manages
DPC | DPS | SPC | SPS | MPS | MV | Setpoint | Counter
(*1)
DPC | DPS | SPC | SPS | MPS | MV | Setpoint | Counter
(*2)

The GTW is server of the "Slow automation" Datapoints (3) and of the managed Datapoints (2).

The GTW is client of the used Datapoints (1).

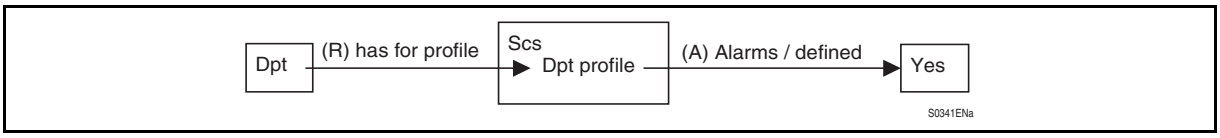
2.7.3.2.2 OI server

2.7.3.2.2.1 System Datapoints



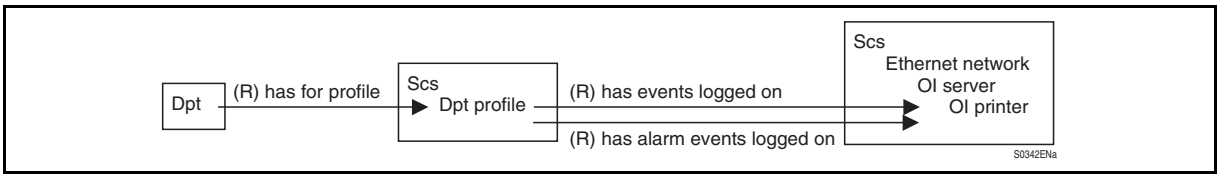
The "OI server" is **Server** of each System Datapoint "SystDpt".

2.7.3.2.2.2 Alarmed Datapoints



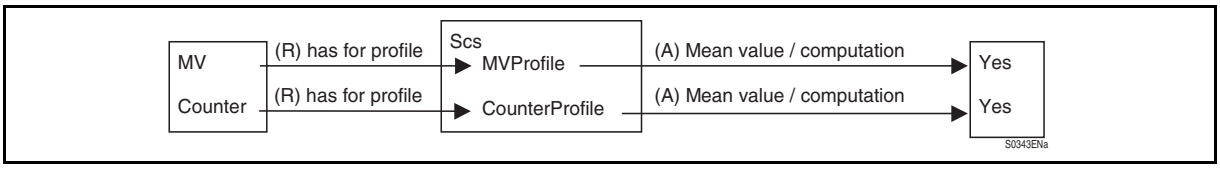
All the "OI server" devices (except backups and datapoints which are not auto-addressed) are **Clients** of each Alarmed Datapoint.

2.7.3.2.2.3 Logged Datapoints



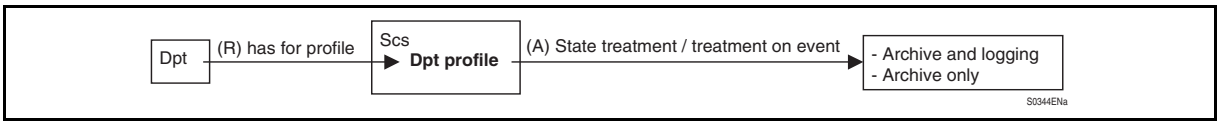
The "OI server" is **Client** of the Datapoint "Dpt", except datapoints which are not auto-addressed.

2.7.3.2.2.4 Mean value computation Datapoint



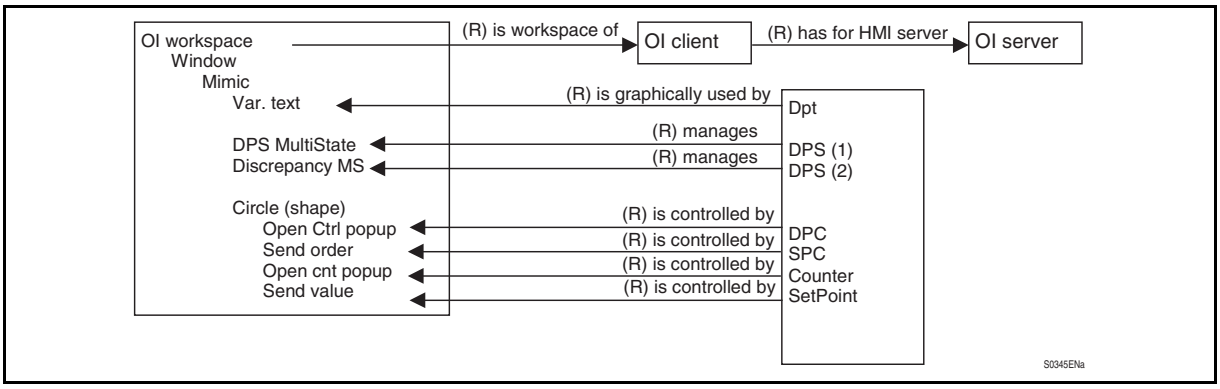
All the "OI server" devices (except backups and datapoints which are not auto-addressed) are **Clients** of each Datapoint having a Mean Value computation.

2.7.3.2.2.5 Archived Datapoint



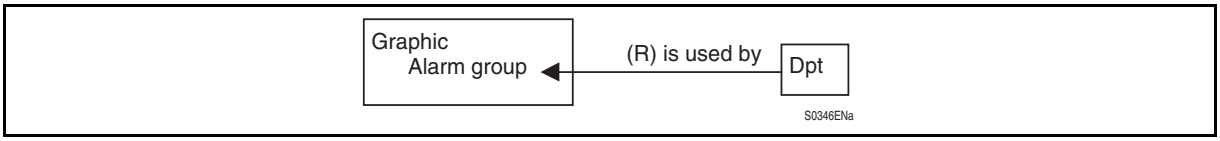
All the "OI server" devices (except backups and datapoints which are not auto-addressed) are **Clients** of each archived Datapoint.

2.7.3.2.2.6 Datapoint used by a graphic animation



The "OI server" is **Client** of all the Datapoints used by a graphical animation.

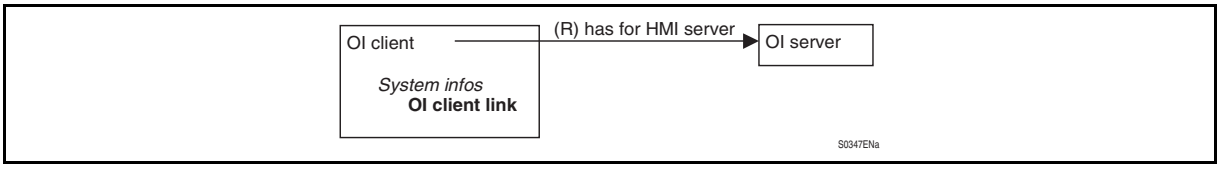
2.7.3.2.2.7 Datapoint used by Alarm Group



All the "OI server" devices (except backups) are **Clients** of each Datapoint used by an "Alarm group".

2.7.3.2.3 OI client

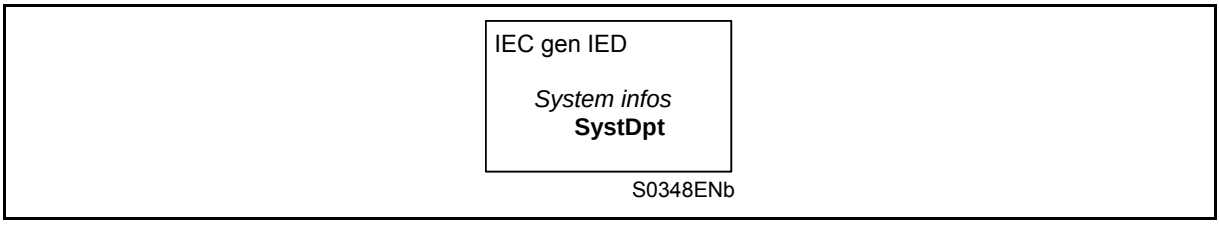
2.7.3.2.3.1 System Datapoints



The "OI server" is **Server** of the System Datapoint "OI client link" of the "OI client".

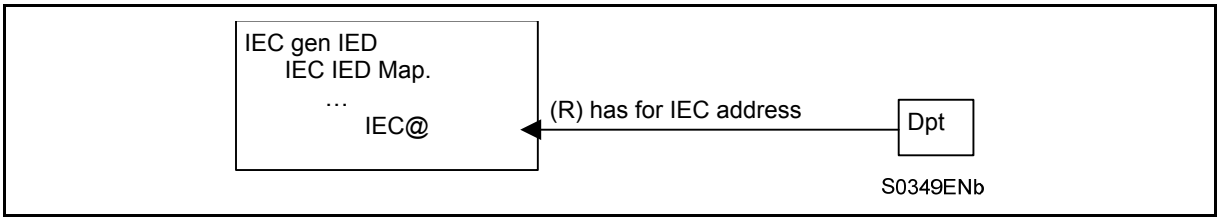
2.7.3.2.4 IEC generic IED

2.7.3.2.4.1 System Datapoints



The "IEC gen IED" is **Server** of each System Datapoint "SystDpt".

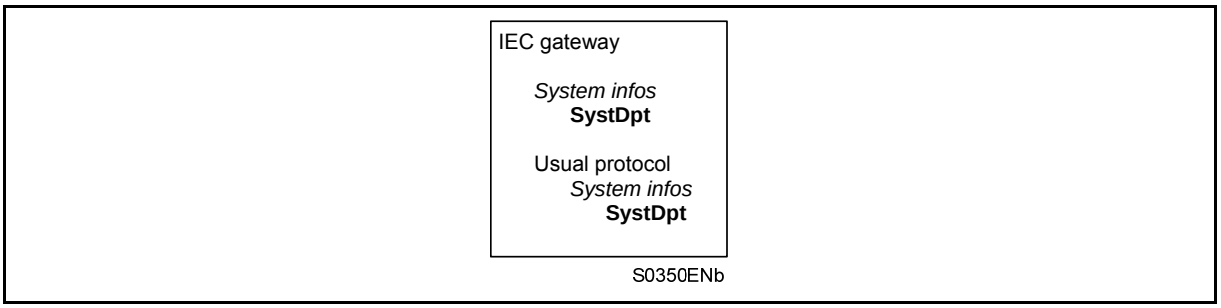
2.7.3.2.4.2 IEC addressed Datapoint



The "IEC gen IED" is **Server** of each Datapoint linked to an IEC address of its mapping.

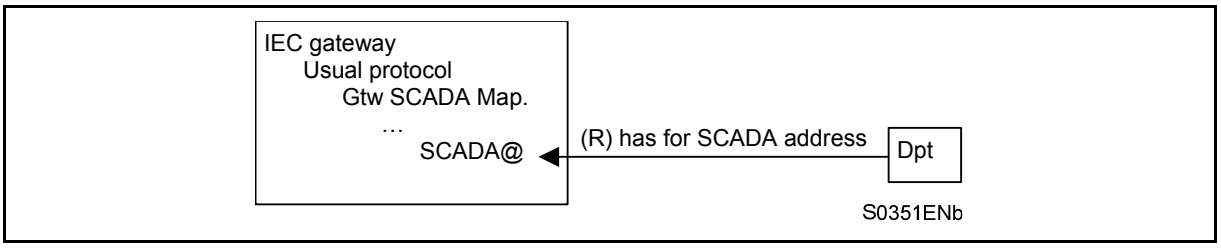
2.7.3.2.5 IEC Gateway

2.7.3.2.5.1 System Datapoints



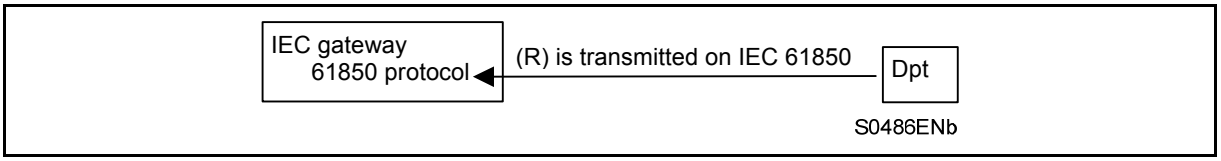
The "IEC gateway" is **Server** of each System Datapoint "SystDpt".

2.7.3.2.5.2 SCADA addressed Datapoint



The "IEC gateway" is **Client** of each Datapoint linked to a SCADA address of its mapping.

2.7.3.2.5.3 IEC61850 addressed Datapoint



The "IEC gateway" is **Client** of each Datapoint transmitted to a 61850 protocol.

2.7.3.2.6 OI Bay

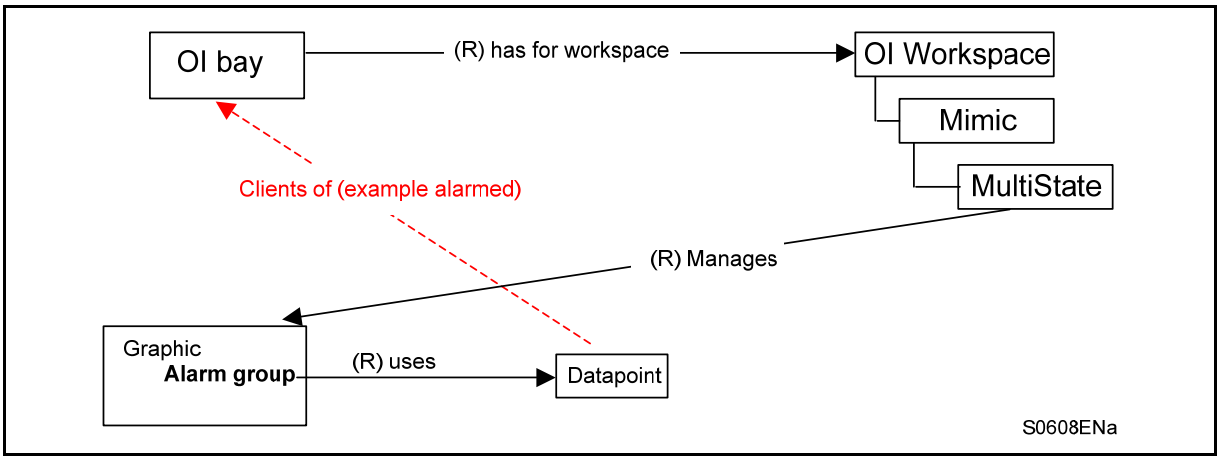
- The maximum number of data points displayed on OI panel must be lower or equals to 500.

02256 / OI Bay / An OI bay can't be clients of more than 500 datapoints (current number of datapoints)

- The Klaxon usage value on a Standard Command Banner of an OI Bay must be set to No, because OI bay doesn't manage Klaxon option.

76255 / OI Bay Klaxon usage value on Standard Command Banner of an OI Bay must be set to No (OI bay),

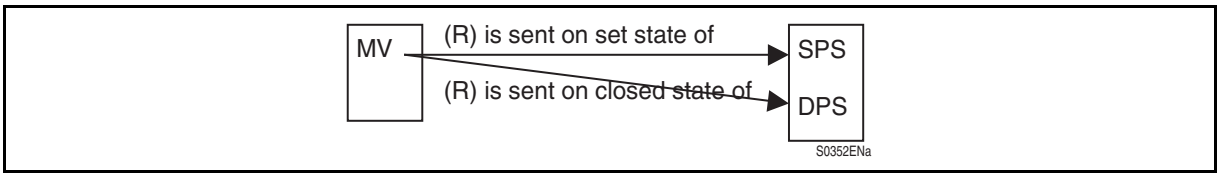
- The alarm group used in a Mimic of an OI bay must have at least one datapoint client of this OI Panel.



76264/ OI Bay / Alarm group used by the OI bay must have at least one datapoint client of OI bay-> [Graphic | ALR.GRP.NOT.OI],

2.7.4 Datapoints constraints

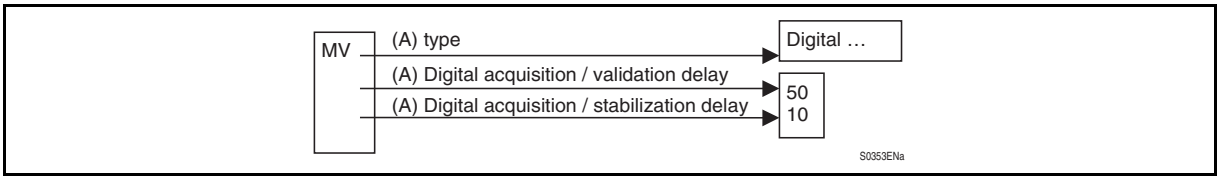
2.7.4.1 MV Datapoints sent on 'set' or 'close' state



The two relations "is sent on set state of" and "is sent on closed state of" are mutually exclusive.

28069 / RelationSentOnSetOrClosedState / The relations, sent on 'set' and 'closed' states, are exclusive

2.7.4.2 MV Datapoints digital acquisition



If the attribute "type" of the "MV" Datapoint is set to a "Digital…" value, then the following constraint between the two attributes must be respected:

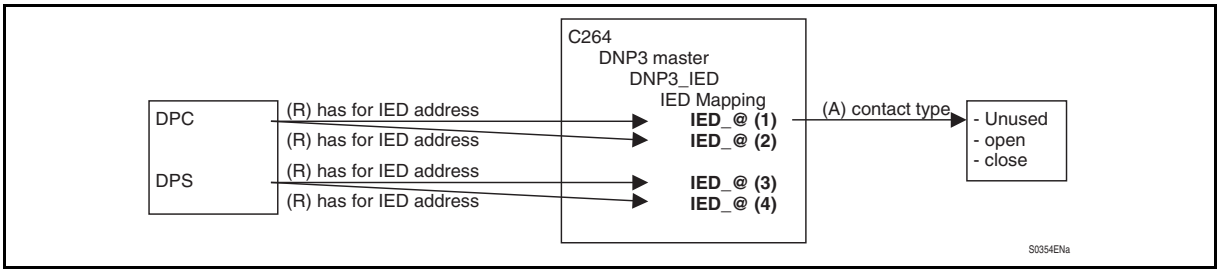
"validation delay" ≥ 5 ∗ "stabilization delay"

*51081 / MV_*Acquisition */ validation delay (x 10 ms) is not greater than 5 * stabilization delay (x 10 ms)*

Moreover, avoid using a cyclic transmission for digital measurement:

57256 / MVDatapoint / Avoid cyclic transmission for digital measurement

2.7.4.3 DPC and DPS Datapoints linked to IED addresses



A "DPC" or "DPS" Datapoint can have 1 or 2 relation(s) "has for IED address".

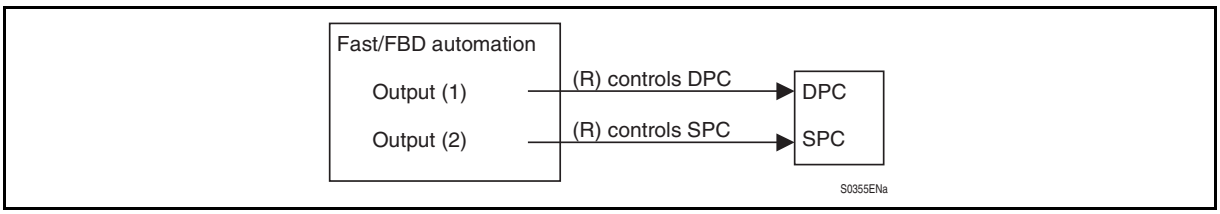
- In the case of 1 IED address the attribute "contact type" of the IED address must be set to the "Unused" value.
- In the case of 2 IED addresses the attribute "contact type" of one of the IED addresses must be set to the "open" value, and the attribute "contact type" of the other IED address must be set to the "close" value.

18134 / xxxAddressOnIED / The attribute value of the referenced IED address is not valid

Examples:

18134 / xxxAddressOnIED / The attribute value of the referenced IED address is not valid-> [Scs | Ethernet network | C264 | DNP3 master | DNP3_IED | IED Mapping | IED DPC Mapping | DPC addr. on IED | contact type, Unused]

2.7.4.4 DPC/SPC Datapoints linked to Output plugs of Fast/FBD automations



A "DPC" or "SPC" Datapoint can be linked to an Output plug of a Fast (or FBD) Automation through the relation "controls DPC" or "controls SPC".

These relations are not compatible with the following ones:

- relations defining the Control Source, except the "…wired on" relation(s)
- relation "has for IEC address" whatever the link type
- relation "has for SCADA address".
- relation "is controlled on state change of".
- relation "has for AutoManu dependency".
- relation "has for feedback".
- relation "has for local/remote dependency".

39044 / DatapointServer / The relation types are not compatible

Examples:

39044 / DatapointServer / The relation types are not compatible-> [is controlled by: Output, has for IEC address: GenDCO]

39044 / DatapointServer / The relation types are not compatible-> [is controlled by: Output, has for SCADA address: Gtw DPC addr.]

39044 / DatapointServer / The relation types are not compatible-> [is controlled by: Output, has for IED address: DPC addr. on IED]

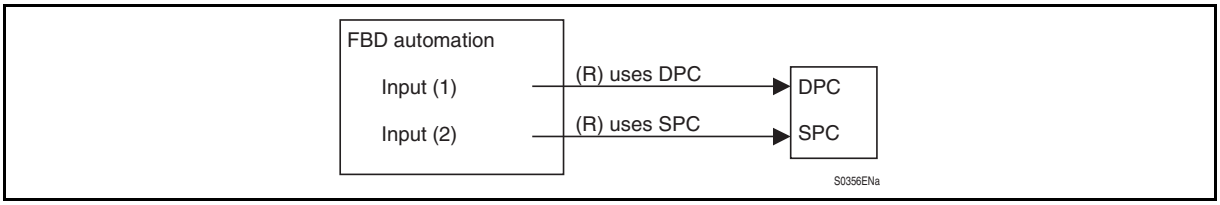
39044 / DatapointServer / The relation types are not compatible-> [is controlled by: FBD output, is controlled on state change of: Substation DPS]

39044 / DatapointServer / The relation types are not compatible-> [is controlled by: FBD output, has for AutoManu dependency: Substation DPS]

39044 / DatapointServer / The relation types are not compatible-> [is controlled by: FBD output, has for feedback: Substation DPS]

39044 / DatapointServer / The relation types are not compatible-> [is controlled by: FBD output, has for local/remote dependency: Local/remote DPS]

2.7.4.5 DPC/SPC Datapoints linked to Input plugs of FBD automations



A "DPC" or "SPC" Datapoint can be linked to an Input plug of a FBD Automation through the relation "uses DPC" or "uses SPC".

These relations are not compatible with the following ones:

- relations defining the Control Source: "…wired on"
- relation defining the Control Source: "has for IED address"

39044 / DatapointServer / The relation types are not compatible

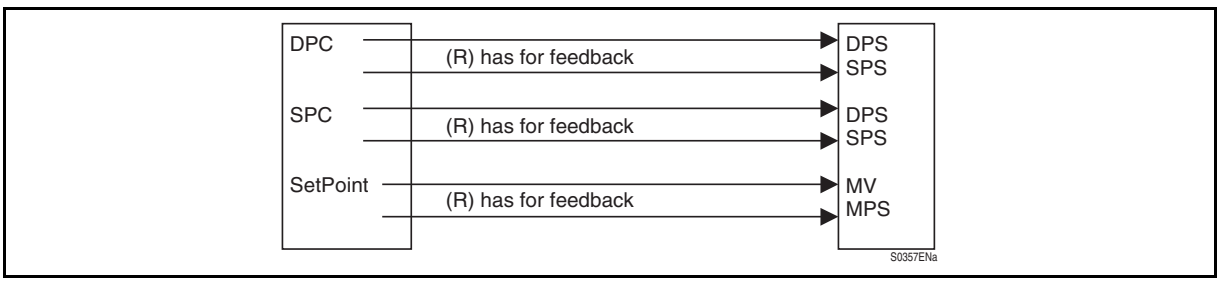
Examples:

39044 / DatapointServer / The relation types are not compatible-> [is used by: FBD input, 'open' wired on: DO # 1 (NO)]

39044 / DatapointServer / The relation types are not compatible-> [is used by: FBD input, 'closed' wired on: DO # 0 (NO)]

39044 / DatapointServer / The relation types are not compatible-> [is used by: FBD input, has for IED address: DPC addr. on IED]

2.7.4.6 Relation "has for feedback"



For each "DPC", "SPC" or "Setpoint" Datapoint, 2 relations "has for feedback" are available, but they are mutually exclusive.

14023 / RelationHasForFeedback / Multiple links to feedbacks

A Datapoint and its feedback Datapoint must comply with the following rules:

- both must have the same Server device
- if one of them is a "Wired" Datapoint, the other one must be "Wired" too.

- if one of them is a "System" Datapoint, the other one must be "System" too.
- if one of them is linked to an "IEC gen IED" through the relation "has for IEC address", this relation must also be defined for the other one.

This rule does not concern the CB Computed Pos datapoint when it is feedback of a wired SPC/DPC control of a breaker.

NOTE: Here, the term "Wired" means that the datapoint is linked to a digital or analogue channel of a computer, or linked to an IED address, else it's "System".

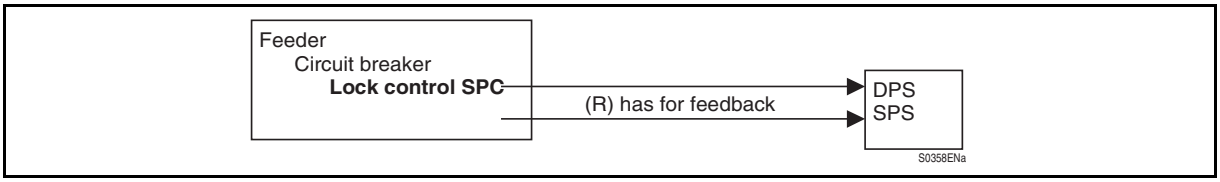
14026 / RelationHasForFeedback / The datapoint and its feedback have not the same server (servers)

14028 / RelationHasForFeedback / The datapoint and its feedback are not both wired

14027 / RelationHasForFeedback / The datapoint and its feedback are not both system

14029 / RelationHasForFeedback / The datapoint and its feedback are not both linked to an address of a Generic IED

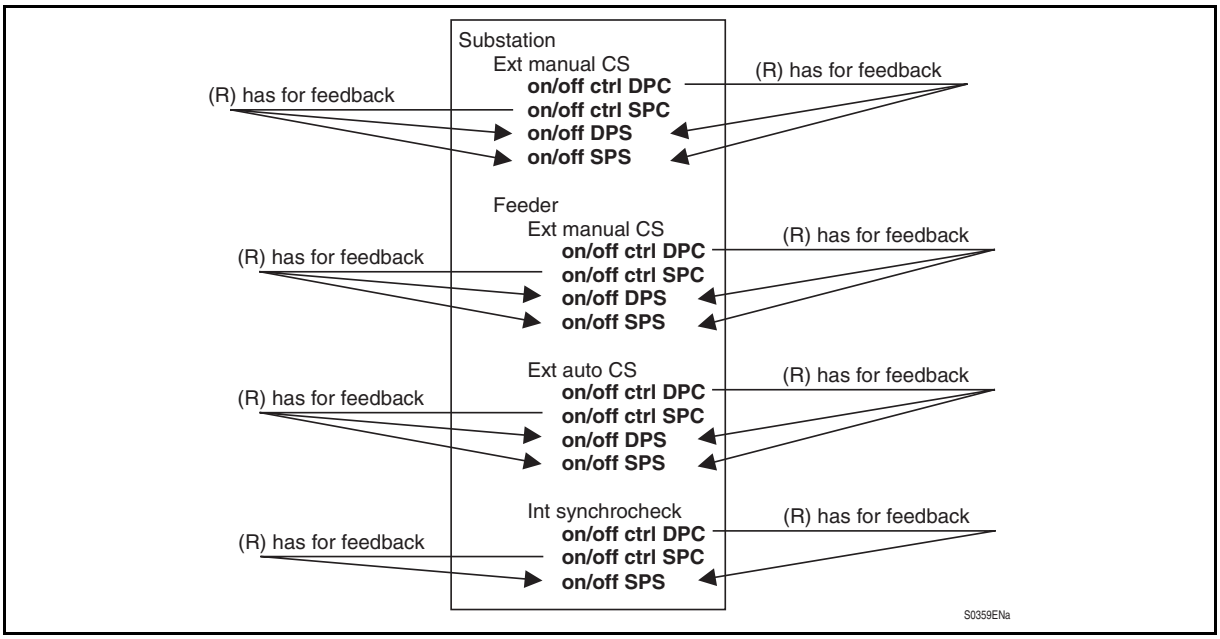
Case of the Circuit-breaker "Lock control SPC" Datapoint:



One relation "has for feedback" is mandatory.

14022 / RelationHasForFeedback / The link to feedback is missing

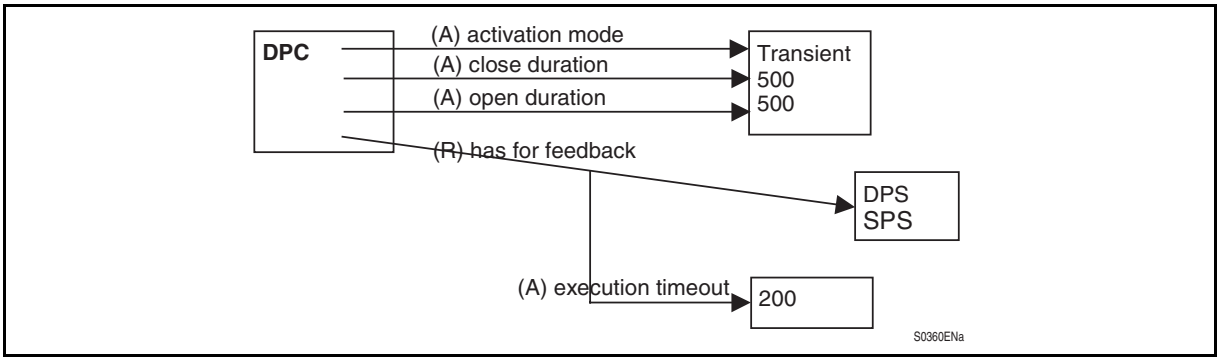
Case of the Synchrocheck On/Off Command Datapoints:



If the "on/off ctrl DPC" or "on/off ctrl SPC" Datapoint of a Synchrocheck function is linked to a feedback through the relation "has for feedback", then the feedback must be the "on/off DPS" or "on/off SPS" Datapoint of the same Synchrocheck function.

14050 / RelationHasForFeedback / The relation link is not valid

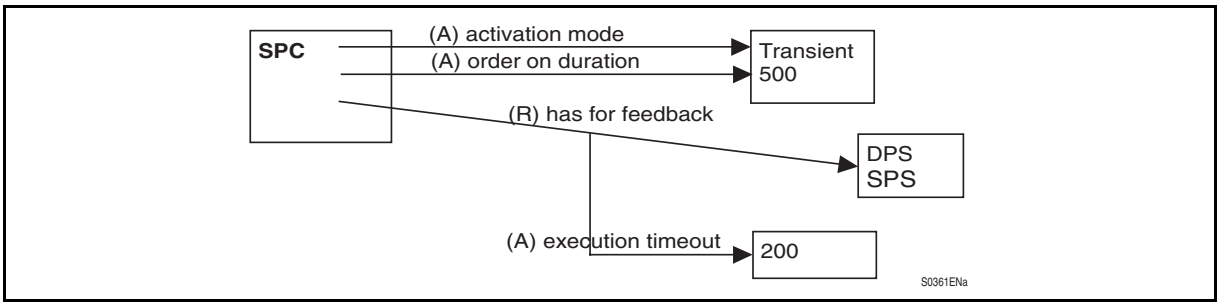
Feedback execution timeout:



For a "DPC" Datapoint, if its attribute "activation mode" is set to the "Transient" value, then the following rule must be respected:

"execution timeout" > max ["open duration" , "close duration"]

14024 / RelationHasForFeedback / The feedback execution timeout (x ms) is lower than the max[open duration (ms), close duration (ms)]-> [200, 500, 500]



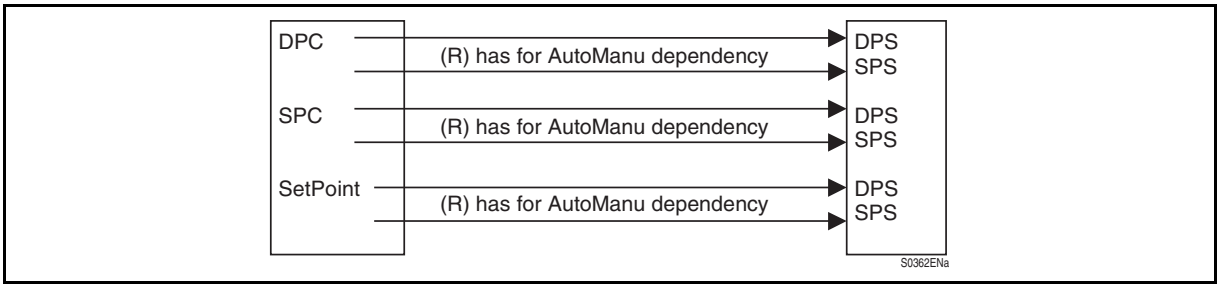
For a "SPC" Datapoint, if its attribute "activation mode" is set to the "Transient" value, then the following rule must be respected:

"execution timeout" > "order on duration"

14025 / RelationHasForFeedback / The feedback execution timeout (ms) is lower than the order on duration (ms)-> [200, 500]

14166 / RelationHasForFeedback / A computed MV can't be the feedback of a SetPoint.

2.7.4.7 Relation "has for AutoManu dependency"



For each "DPC", "SPC" or "Setpoint" Datapoint, 2 relations "has for AutoManu dependency" are available, but they are mutually exclusive.

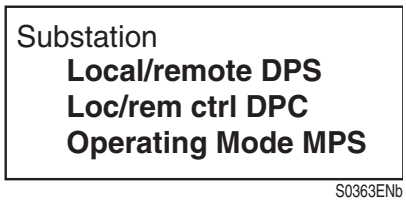
16032 / RelationHasForAutoManuDependency / Multiple links to AutoMany dependencies

Case of the "Raise/lower DPC" Datapoint:

refer to § 2.7.3.2.1 Computer

2.7.4.8 Local/Remote Datapoints

Substation Mode Datapoints:



NOTE: Hereafter, the term "wired" means that the datapoint must be linked to a digital channel of a computer.

- if "Loc/rem ctrl DPC" is present, then "Local/remote DPS" must be present (it's the feedback)
- if "Local/remote DPS" is not wired, then "Loc/rem ctrl DPC" is mandatory
- if "Local/remote DPS" is wired, then "Loc/rem ctrl DPC" is not mandatory but, if it's present, it must be wired.

24089 / Datapoint_LocalRemote / The datapoint is missing-> [Local/remote DPS]

24089 / Datapoint_LocalRemote / The datapoint is missing-> [Loc/rem ctrl DPC]

24099 / Datapoint_LocalRemote / The datapoint is not wired

- The two datapoints for operating mode of the substation are exclusive (Local/Remote Substation DPS and Operating mode MPS)

62196 / Operating mode / Datapoints for operating mode are exclusives (Local/Remote Substation DPS and Operating mode MPS)

- Moreover, for any SCADA protocol attached to a substation via a computer or a gateway, the substation operating mode is mandatory ("Local/remote DPS" or "Operating Mode MPS").

62165 / Datapoint_LocalRemote / The datapoint is required for SCADA link -> [Local/remote DPS or Operating Mode MPS]

Bay Local/Remote Datapoints:

NOTE: Hereafter, the term "wired" means that the datapoint must be linked to a digital channel of a computer.

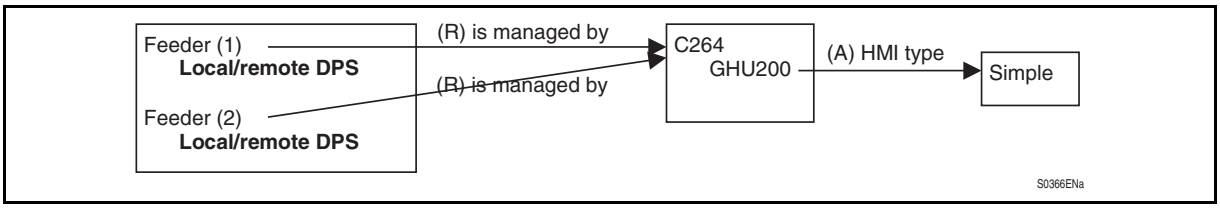
- if "Loc/rem ctrl DPC" is present, then "Local/remote DPS" must be present (it's the feedback)
- if "Local/remote DPS" is not wired, then "Loc/rem ctrl DPC" is not mandatory but, if it's present, it must not be wired.
- if "Local/remote DPS" is wired, then "Loc/rem ctrl DPC" is not mandatory but, if it's present, it must be wired.

24089 / Datapoint_LocalRemote / The datapoint is missing-> [Local/remote DPS]

24100 / Datapoint_LocalRemote / The datapoint is wired

24099 / Datapoint_LocalRemote / The datapoint is not wired

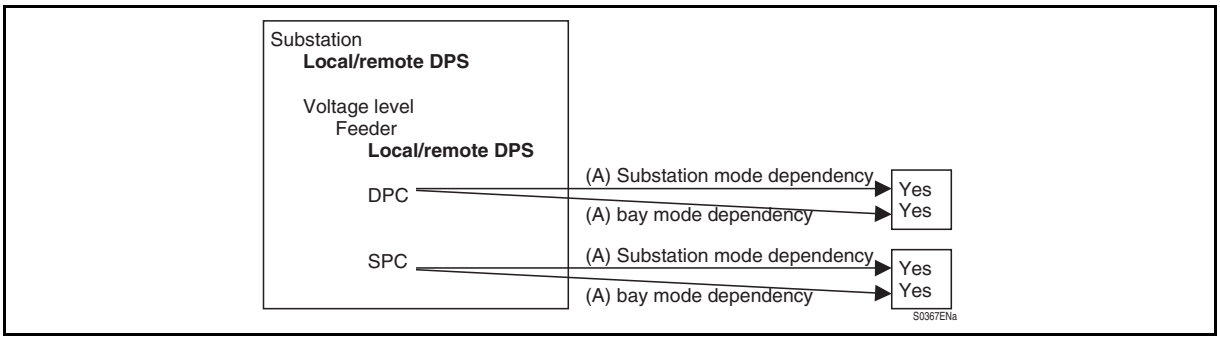
Bay Local/Remote DPS and LHMI:



If the "GHU200" board of a computer has its attribute "HMI type" set to the "Simple" value, then the "Local/remote DPS" Datapoints of the bays managed by this computer must be all be "Wired" or all "System".

24064 / Datapoint_LocalRemote / The acquisition sources of the Local/remote DPS datapoints are mismatched for the simple LHMI

Local/Remote dependency:



If, under a Substation, a "DPC" or "SPC" Datapoint has one attribute "Substation mode dependency" set to "Yes", then the Substation "Local/remote DPS" or “operating mode MPS” Datapoint datapoint must be present.

There are four substation mode dependency attributes:

- Local substation dependency
- Remote substation dependency
- Mode 2 substation dependency
- Mode 3 substation dependency

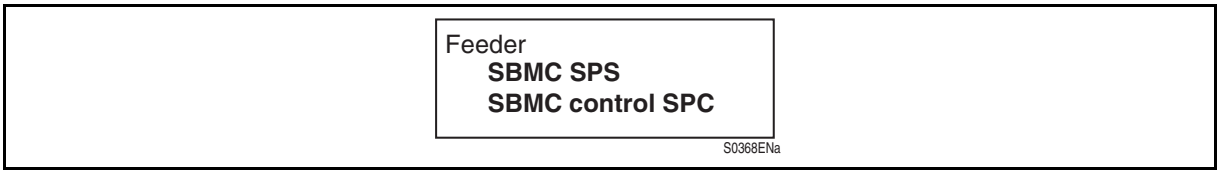
These attributes define the command authorizations for SCADA or OI. When a command is refused, this command is dependent of the substation mode.

62089 / Operating mode / The datapoint is missing-> [Local/remote DPS or Operating mode MPS]

If, under a Bay, a "DPC" or "SPC" Datapoint has its attribute "bay mode dependency" set to "Yes", then the Bay "Local/remote DPS" Datapoint must be present.

24089 / Datapoint_LocalRemote / The datapoint is missing-> [Local/remote DPS]

2.7.4.9 SBMC Datapoints

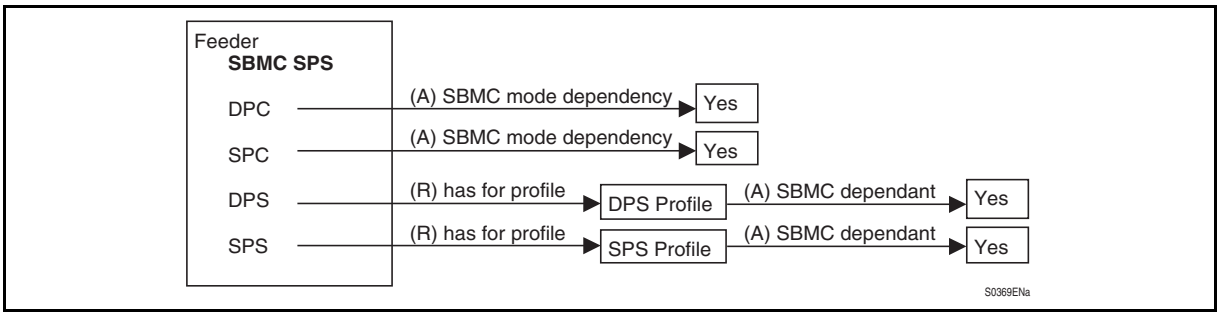


- if "SBMC SPS" is present and not wired, then "SBMC control SPC" must be present
- if "SBMC control SPC" is present, then "SBMC SPS" must be present

25089 / Datapoint_SBMC / The datapoint is missing-> [SBMC control SPC]

25089 / Datapoint_SBMC / The datapoint is missing-> [SBMC SPS]

SBMC dependency:

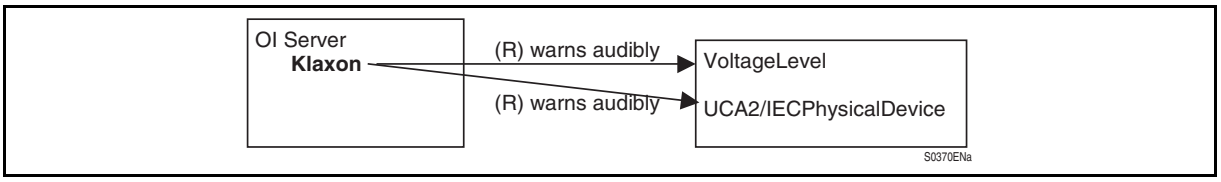


If a "DPC" or "SPC" Datapoint has its attribute "SBMC mode dependency" set to "Yes", then the "SBMC SPS" Datapoint must be present.

If a "DPS" or "SPS" Datapoint has the attribute "SBMC dependant" of its profile set to "Yes", then the "SBMC SPS" Datapoint must be present.

25089 / Datapoint_SBMC / The datapoint is missing-> [SBMC SPS]

2.7.4.10 Datapoints of OI Server Klaxons



A "Klaxon" refers to a set of Datapoints. This set contains all the Datapoints which are in the sub-tree of each "VoltageLevel" and "IEC PhysicalDevice" linked to the klaxon through the relation "warns audibly".

In the set of Datapoints, at least 1 Datapoint must fulfil the following conditions:

- it must be linked to a Datapoint Profile which has its attributes "Alarms / defined" and "Alarms / audible" set to the "Yes" value.
- the "OI Server" must be its Server or its Client
- it must not be the "Main status MV" System Datapoint of a computer.

The sets of Datapoints of each "Klaxon" of an "OI Server" must not share the same Datapoints.

53135 / OIKlaxon / The Klaxon is not associated to audible Datapoints

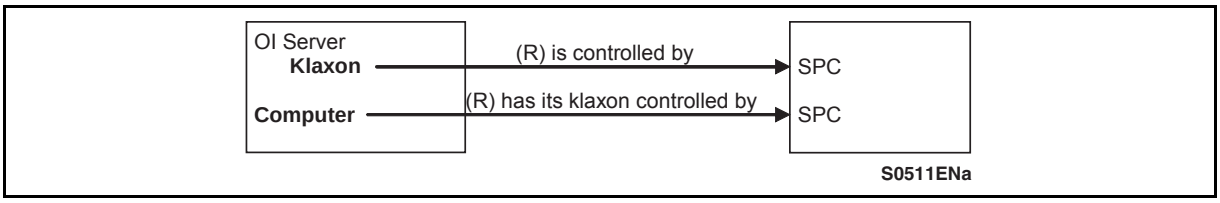
53136 / OIKlaxon / The Klaxons share the same Datapoints

A given Voltage level or IEC PhysicalDevice can not be linked more than once to the same klaxon.

<53147> / OIKlaxon / The same voltage level is associated more than once to the same klaxon

<53148> / OIKlaxon / The same IEC PhysicalDevice is associated more than once to the same klaxon

2.7.4.11 SPC managing a Klaxon



The klaxons can be managed by any SPC. These SPC has to be permanent.

<69214> / SPCDatapoint / When an SPC datapoint manages a klaxon, it must be permanent

2.7.4.12 SPC and DPC Datapoints

Any SPC/DPC datapoint defined as 'permanent until feedback' must be linked to an SPS/DPS via a feedback relation.

<14146> / RelationHasForFeedback / The feedback must be defined for xPC is permanent until feedback

2.7.4.13 Counter Datapoints

Computer can manage a maximum of 128 counters. For C264 RTU Standalone the maximum number of counter is 128 on main rack and all extensions rack.

02279 / CapacityLimits / Scs | Ethernet network | C264 / Invalid count of counter datapoint for this computer (max, count)-> [128, 143]

Main rack or standalone can manage up to 8 wired counter, and extension racks up to 16.

02291 / CapacityLimits / Invalid count of wired counter datapoint for this computer or rack (count, maximum)-> [32, 16]

2.7.4.14 Energy Counter Datapoints

Any counter datapoint defined as energy counter (attribute Type is set to Import or Export Energy) must be linked to an MV via an integration relation and then, a counter which integrate an MV must be an energy counter.

<56161> / CounterDatapoint / The Energy Counter must integrate an MV

<56162> / CounterDatapoint / An Energy Counter which integrate an MV must be Import or Export

When an MV datapoint is integrated by two energy counters, these two counters must not be of same type (import or export).

<57163> / MVDatapoint / An integrated MV can't be integrated by two energy counter with same type (Import or Export)

2.7.4.15 Datapoints linked to SCADA adresses

A datapoint must have only one SCADA address on a same SCADA network.

Exception: the DPS and DPC can have 2 addresses for DNP3 network.

19177 / xxxAddressOnSCADANetwork / The datapoint has two addresses in same SCADA network [SCADA Network, max address]

A datapoint in substation or voltage level with a SCADA address must have an IEC address

19182 / xxxAddressOnSCADANetwork / A datapoint in substation or voltage level with a SCADA address must have an IEC address

2.7.4.16 XPS grouping

Any datapoints group can't contain more than 512 datapoints.

<02179> / CapacityLimits / The maximum number of datapoints in an xPS group is reached (group, count, maximum)

Any group SPS can't contain more than 8 cascading levels of group SPS.

<02287> / CapacityLimits / Too many cascading *levels of group SPS (>8)*

Any group SPS can't contain loop with cascading grouping SPS.

<02286> / CapacityLimits / Loop with cascading grouping SPS detected

2.7.4.17 Datapoint profile Order Usage

For transient SPC with control popup, the “Order off usage” must be set to No

This check is not done for specific case of “on/off ctrl SPC” of an internal manual synchrocheck.

<23183> / DptProfile / A profile of a transient SPC with control popup, must have “Order off usage” set to No (SPC)

2.7.4.18 TM computed by TMU board.

On a TMU board, it can’t be two TM “computed by” with same measure type

<57184> / DptMV / Only one measure type is allowed by TMU board (fixed by relation) (measure type, TMU board)

On a TMU board, in case of Delta topology, the following TM “computed by” measurement type are not allowed:

- active power phase A, B or C
- reactive power phase A, B or C
- apparent power phase A, B or C
- power factor phase A, B or C
- phase angle phase A, B or C

<57190> / DptMV / The measure type is not allowed for delta topology (measure type, TMU board)

<57221> / DptMV / This MV data point type can't be transmitted on IEC 61850 SCADA Network (MV data point type)

On a TMU210 board if the type of connection equals 3Vpp+Vb, the following TM “computed by” measure type are not allowed:

- VAN, RMS value of the voltage phase A
- VBN, RMS value of the voltage phase B
- VCN, RMS value of the voltage phase C

<57230> / DptMV / The measure type is not allowed for the 3Vpp+Vb connection type (measure type, TMU210 board)

On TMU200 / TMU220, additional measurement values are available :

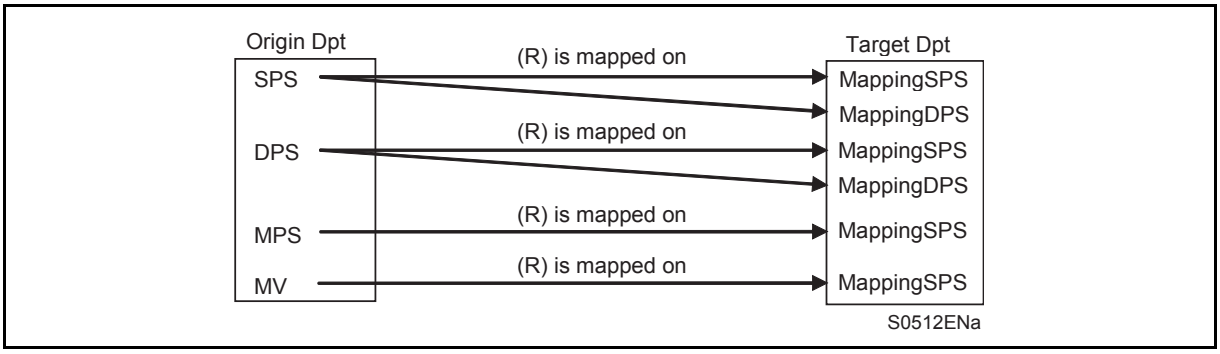
- fundamental (H1 harmonic) of phase A current
- fundamental (H1 harmonic) of phase B current
- fundamental (H1 harmonic) of phase C current
- fundamental (H1 harmonic) of phase A voltage
- fundamental (H1 harmonic) of phase B voltage
- fundamental (H1 harmonic) of phase C voltage

2.7.4.19 Command Panel Assignment

For Raise/Lower DPC, if it is SBO Many, the Command Panel Assignment must be set to No

<61185> / DptRaiseLower / A Raise/Lower DPC SBO Many, must have Command Panel Assignment set to No

2.7.4.20 Datapoint Mapping function



Any configuration database can't contain more than 100 Origin datapoints.

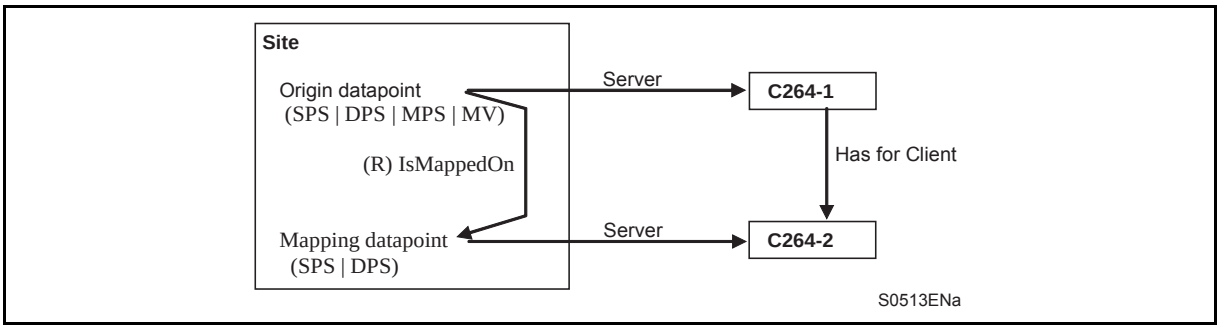
63198 / MaxOriginDpt / The maximum number of Origin Datapoints is reached (count, maximum)

Any Origin datapoint can't be mapped on more than 10 Target datapoints.

63199 / MaxTargetDpt / The maximum number of Target Datapoints per Origin datapoint is reached (count, maximum)

Any Target datapoint must map only one Origin datapoint.

63200 / UnicityOriginDpt / A MappingxPS datapoint (target) must map only one Origin Datapoint.(count, maximum)



If the Server of the Origin Dpt (Example C264-1) is different of the Server of Mapping Dpt (Example C264-2) then C264-1 has for client C264-2.

22149 / DatapointClient / The client-server relation must be goosed for Automation/Mapping usage at client level (server, client)

22150 / DatapointClient / The IEC relevant address must be goosed for Automation/Mapping usage

2.7.4.21 MV Datapoints value features and scaling checks

A “MV” datapoint must be configured for it’s value features and scaling.

- The maximum value must be strictly greater than the minimum value (value features tab):

57235 / MVDatapoint /The max value of a MV must be strictly greater than the min value (min value, max value)

Examples:

57235 / MVDatapoint /The max value of a MV must be strictly greater than the min value (min value, max value) -> [0.0, 0.0]

- The maximum acquisition value must be strictly greater than the minimum acquisition value (scaling tab):

57236 / MVDatapoint / The max acquisition value of a MV must be strictly greater than the min acquisition value (min value, max value)

Examples:

57236 / MVDatapoint / The max acquisition value of a MV must be strictly greater than the min acquisition value (min value, max value) -> [120.0, 50.0]

- The threshold configuration must follow some rules (value features tab):

Considering computed value ‘diff’ with following formula

Diff = ((maximum value - minimum value) * hysteresis) / 100

and considering low threshold as L, LL and LLL and high threshold as H, HH, HHH

1) For configured threshold, each threshold must be greater than previous one (HHH>HH>H>L>LL>LLL)

2) all configured H thresholds must be greater than previous configured one by at least ‘diff’ (HHH>HH+diff and HH>H+diff)

3) all configured L thresholds must be greater than previous configured one by at least ‘diff’ (L>LL+diff and LL>LLL+diff)

4) first configured H threshold must be greater than last configured L threshold by at least ‘diff’ * 2 (H>L+diff*2 or HH>L+diff*2 etc.)

57237 / MVDatapoint / Threshold must be greater than previous configured one with at least given difference (threshold, current value, previous value, difference)

Examples:

57237 / MVDatapoint / Threshold must be greater than previous configured one with at least given difference (threshold, current value, previous value, difference)-> [low-low threshold, 50.0, 30.0, 25.0]

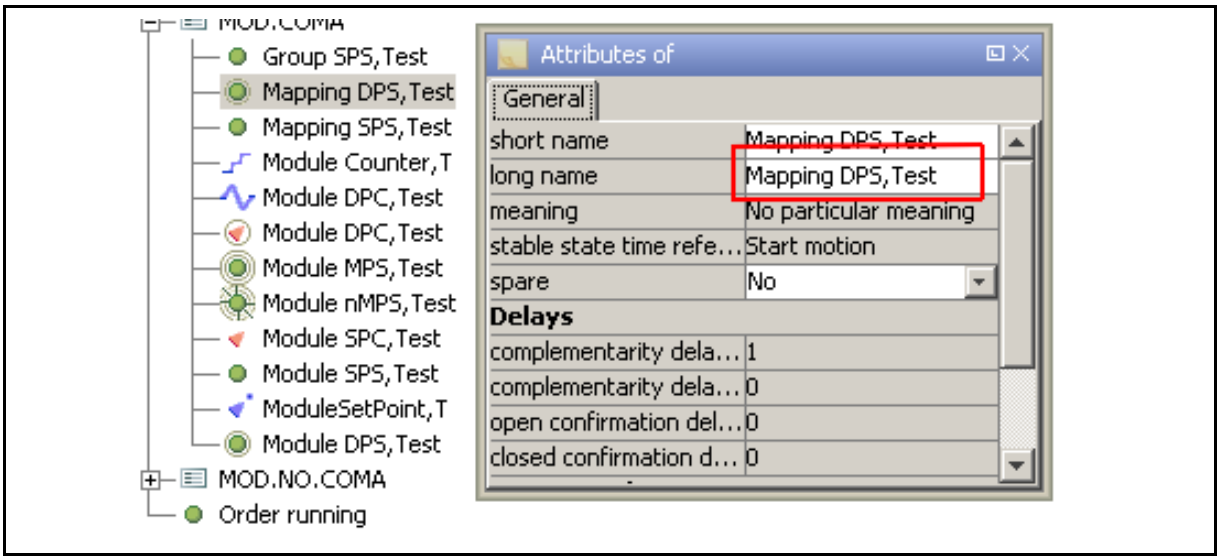
2.7.4.22 MV datapoints Deadband value

A MV datapoints with 'deadband' value equals to 0 and transmission on event configured on 'According to a ‰ of full scale' or 'According to a ‰ of current value' value must be issued from IEC 103 IED and must have 'ASDU number' equals to 4 on its IED address.

57266 / MV Datapoint / Only MV issue from IEC 103 IED with ASDU number equals to 4 can have a deadband value equals to 0

2.7.4.22 Data point Short Name and Long Name constraints

Datapoint must not has a comma character (",") in Short name or Long name attribute in any languages.

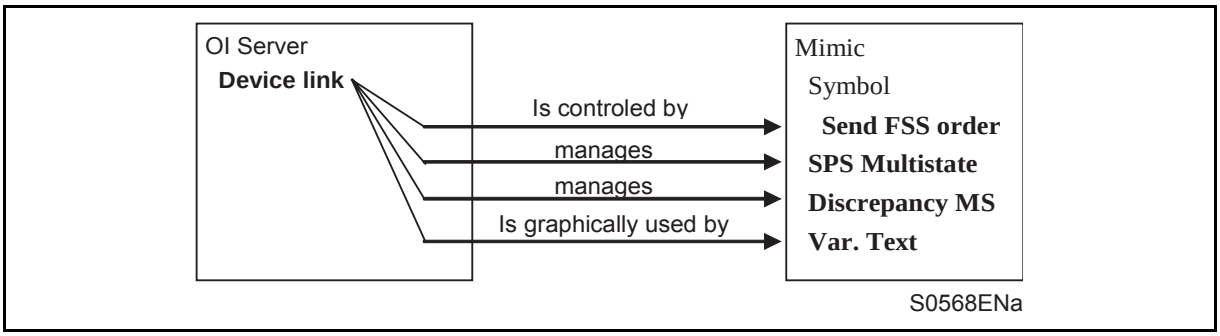


NAME CONSTRAINTS

73229 / Datapoint / Invalid character find in datapoint attribute (Attribute, Invalid character, OI language)-> [long name, ',', US English]

2.7.4.23 Device link datapoint constraint

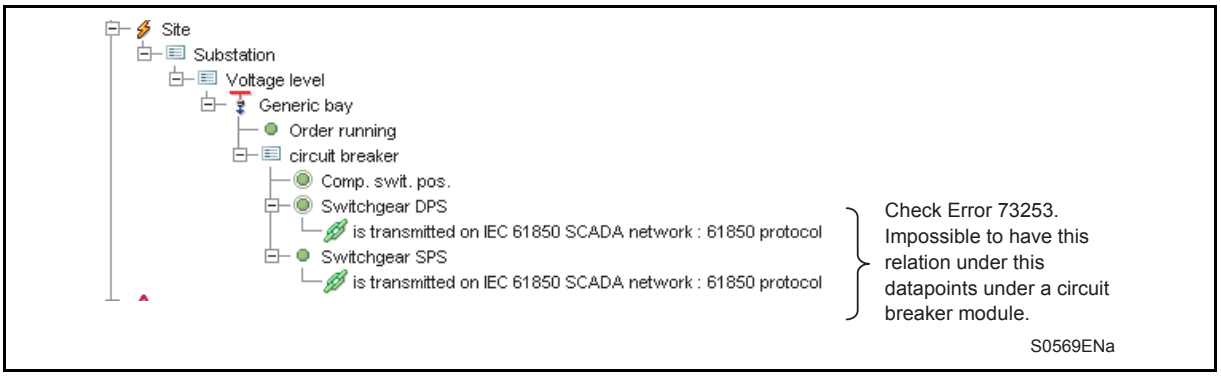
The device link datapoint of an OI server can't be use in a mimic.



73238 / Datapoint / Device link datapoint of OI server can't be used in a mimic (graphical element)

2.7.4.23 Switchgear pos. (SPS/DPS) datapoints constraint

For datapoint Switchgear pos.(SPS : SwitchPos_SPS, DPS : SwitchPos) must not has relation ‘is transmitted on IEC61850 SCADA network’ if they are created under a ‘Circuit breaker’ (XCBR) module.



SWITCHGEAR POS

73253 / Datapoint / Relation 'is Transmitted on IEC 61850 SCADA network' is invalid for this datapoint under circuit breaker module

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PROBLEM ANALYSIS

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1. SCOPE OF THE DOCUMENT

This document is a chapter of the PACiS System Configuration Editor PACiS SCE V4.8, describing the Problem Analysis (SCE/EN PR) of this product.

2. INITIAL PROBLEM IDENTIFICATION

Consult the table below to find the description that best matches the problem experienced, then consult the section referenced to perform a more detailed analysis of the problem.

Symptom	Refer to chapter
Position of the windows in the main window application can be now more moved to the right place	Window managing
Equipment Reboots during normal operation	ERROR CODE DURING OPERATION
Error during normal operation	ERROR CODE DURING OPERATION

3. ERROR CODE DURING OPERATION

A checking error code is an error or a warning message displayed in a dedicated table, after a consistency database check. The checking error codes are completely defined in the SCE/EN MF chapter: error code description and checked consistency rule definition.

Error while an import action: This error could occur during the import of .xml files. The import errors are completely defined in chapter Human Machine Interface (SCE/EN HI, tools/import section). Workaround: check the validity of the imported file with a xml editor like xml spy.

Memory fault: during operation that needs lot of memory, a Java software error/exception [memory fault] could occur. Workaround: Adjust the Java heap size with your ram size. Follow instructions described in chapter installation (SCE/EN IN).

Other exception: apply a bug report procedure.

4. WINDOW MANAGING

Managing **dockable windows**: after many user manipulations, the position and the displaying of dockable windows could be inconsistent.

Workaround: click on the button that is located in the main toolbar or choose the menu item window/reset perspective. The default perspective is displayed again.

LEXICON

CONTENT

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1. SCOPE OF THE DOCUMENT

This document is the last chapter of each PACiS documentation. It is the lexicon.

2. LEXICON

AC	Alternating Current
AccI	Accumulator Input
ACSI	Abstract Communication Service Interface Mapping from the standard IEC61850 abstract specification of communication service to a concrete communication infrastructure based on CORBA specific.
A/D	Analog/Digital
ADC	Analogue to Digital Converter
AE qualifier	Application Entity qualifier (Used internally by IEC61850 to identify a server Application)
AI	Analogue Input (Measurement Value including state attribute) Commonly Voltage or current DC signals delivered by transducers, and representing an external value (refer to CT/VT for AC).
AIS	Air Insulated Substation
AIU	Analogue Input Unit (Computer C264 Board name for DC Analogue Input)
Alarm	An alarm is any event tagged as an alarm during configuration phase
AO	Analogue Output Value corresponding to a desired output current applied to a DAC.
AOU	Analogue Output Unit (computer C264 board name for Analogue Output)
API	Application Programming Interfaces
AR	Auto-Reclose
ARS	Auto-Recloser
ASCII	American Standard Code for Information Interchange
ASDU	Application Specific Data Unit Name given in OSI protocol for applicative data (T103, T101..)
ASE	Applied System Engineering
ATCC	Automatic Tap Change Control Automation in charge of secondary voltage regulation, more specific than AVR
AVR	Automatic Voltage Regulator Automatism used to regulate secondary voltage by automatic tap changer control (see ATCC). Set of features can be added, see chapter C264 FT
Bay	Set of LV, MV or HV plants (switchgears and transformers) and devices (Protective, Measurement…) usually around a Circuit Breaker and controlled by a bay computer.
BCD	Binary Coded Decimal One C264 supported coding on a set of Digital Inputs, that determine a Digital Measurement, then Measurement value (with specific invalid code when coding is not valid). Each decimal digit is coded by 4 binary digits.
BCP	Bay Control Point Name given to the device or part used to control a bay. It can be Mosaic Panel, C264 LCD,… Usually associate with Remote/Local control.
BCU	Bay Control Unit Name given to the C264 in charge of a bay. Usually in contrast with Standalone
BI	Binary Input (or Information) Name given into Computer C264 of information already filtered, before it becomes an SPS, DPS… with time tag and quality attributes

BIU	Basic Interface Unit C264 Board for auxiliary power supply, watchdog relay, redundancy I/O
BNC	A connector for coaxial cable.
B-Watch	Monitoring and control device for GIS substation.
CAD	Computer Aided Design Computer application dedicated to design like wiring, protective setting…
CAS	CASe Computer C264 rack
CB	Circuit Breaker Specific dipole switch with capability to make line current and break fault current. Some have isolation capability (nominal-earth at each side)
CBC	Compact Bay Controller Small capacity bay computer for Medium Voltage applications typically C264C
CC	Complemented Contact
CCU	Circuit breaker Control Unit Computer C264 Board dedicated to switch control with 8DI, 4 DO
CDM	Conceptual Data Modelling Is the modelling of system/devices data using a hierarchy of structured data (called object of class) with their attributes, method or properties and the relations between themselves. It maps common data to devices or components of devices, with guaranty of interoperability.
Class	Define in IEC61850 as: description of a set of objects that share the same attributes, services, relationships, and semantics
Client	Define in IEC61850 as: entity that requests a service from a server and that receives unsolicited messages from a server
CM	CoMissioning
CMT	Computer Maintenance Tool
CO	Command, logic information Output (Functional Component) / Contact Open
COMTRADE	Common Format For Transient Data Exchange (international standard IEC 60255-24)
CPU	Central Processing Unit Computer C264 main Board based on PowerPC
CRC	Cyclic Redundancy Check Coding result send with packet of transmitted data to guarantee their integrity. Usually result of a division of transmitted data by polynomial.
CSV	Character Separate Values ASCII values separated by predefined character or string like in Excel or ASCII Comtrade.
CT	Current Transformer Basically the electric device connected to process and extracting a current measurement. By extension part of a device (C264) that receives AC values and convert it to numerical measurement value.
CT/VT (Conventional)	Current and Voltage transformers By extension, it is the C264 TMU board.
CT/VT (Non-Conventional or intelligent)	Current and Voltage transformers New generation of captor based for example on light diffraction under electric field, without transformer, that gives directly numerical measurement of voltage and current like communicating IED.

CSV	Character Separate Values Asci values separated by predefined character or string like in Excel or ASCII Comtrade.
DAC	Data Acquisition component of the GPT
DAC	Digital to Analogue Converter Used to generate analogue signals (usually DC) from a digital value.
DB	DataBase Tool or set of data that define all configuration of a system or specific device like computer. Opposed to setting or parameter DB has a structure that can not be modified on line. DB are always versioned.
DB-9	A 9-pin family of plugs and sockets widely used in communications and computer devices.
DBI	Don't Believe It Term used for undefined state of a double point when input are not complementary. DBI00 is state motion or jammed. DBI11 is undefined.
DBID	Databases Identity Brick
DC	Direct Current
DC, DPC	Double (Point) Control Two digit and/or relays outputs used for device control with complementary meaning (OPEN, CLOSE).
DCF77	External master clock and protocol transmission LF transmitter located at Mainflingen, Germany, about 25 km south-east of Frankfurt/Main, broadcasting legal time on a 77.5 kHz standard frequency.
DCO	Double Control Output
DCP	Device Control Point Located at device level (electric device or IED). It should have its own Remote/Local switch.
DCS	Digital Control System Generic name of system based on numeric communication and devices, to be opposed to traditional electrically wired control.
DCT	Double CounTer Counter based on 2 DI with complementary states (counting switchgear manoeuvre for example)
DE	Direct Execute
DELTA	Phase to phase delta values
Device	Term used for one of the following unit: Protective relays, metering units, IED, switchgear (switching device such as CB, disconnector or earthing switch), disturbance or quality recorders.
DHMI	C264 Display HMI
DI	Digital Input Binary information related to the presence or to the absence of an external signal, delivered by a voltage source.
DIN	Deutsche Institut für Normung The German standardisation body.
DIU	DC Input Unit Computer C264 Board name for Digital Input
DLL	Dynamic Link Library. Available on Windows XP. A feature that allows executable code modules to be loaded on demand and linked at run time. This enables the library-code fields to be updated automatically, transparent to applications, and then unloaded when they are no longer needed.

DM	Digital Measurement Is a measurement value which acquisition is done by DI and a specific coding BCD, Gray, 1 among N…
DNP3.0	Distributed Network Protocol DNP3 is a set of communication protocols used between components in process automation systems.
DO	Digital Output Used to apply a voltage to an external device via a relay, in order to execute single or dual, transient or permanent commands.
DOF	Degree Of Freedom Used for a template attribute, that can be modified or not when used. An attribute has a degree of freedom if a user can modify its values on its instances
DOU	Digital Output Unit Computer C264 Board name for Digital Output
DP	Double Point Information/control derived from 2 digital inputs/output; usually used for position indication of switching devices (OPEN, CLOSE).
DPC	Double Point Control
DPS	Double Point Status Position indication of switching devices (OPEN, CLOSE).
ECDD	Coherent Extract of Distributed Data
ECU	Extended Communication Unit. External module connected to the CPU board. This module converts non-insulated RS232 into optical signal or insulated RS485/RS422.
EH90	Transmission protocol dedicated to time synchronisation and standardised by EDF. Specification document: D.652/90-26c, March 1991.
EMC	Electro-Magnetic Compatibility
EPATR	Ensemble de Protection Ampèremétrique de Terre Résistante (French Legacy very resistive earth current module)
Event	An event is a time tagged change of state/value acquired or transmitted by a digital control system.
FAT	Factory Acceptance Test Validation procedures execution with the customer at factory.(i.e. SAT)
FBD	Functional Block Diagram One of the IEC61131-3 programming languages (language used to define configurable automation).
FIFO	First In First Out
FO	Fibre Optic
FP	Front Panel
FTP	Foil Twisted Pair
FLS	Fast Load Shedding
FSS	Force Suppress Substitute
Gateway	Level 6 session of OSI, the gateway is any device transferring data between different networks and/or protocol. The RTU function of the C264 gives a gateway behaviour to SCADA or RCP level. PACIS Gateway is separate PC base device dedicated to this function.
GHU	Graphic Human interface Unit Computer C264 Front Panel digital part (LCD, buttons, Front RS)
GIS	Gas Insulated Substation

GLOBE	GLOBE Brick
GMT	Greenwich Mean Time Absolute time reference
GPS	Global Positioning System Based on triangulation from satellite signal, that transmit also absolute GMT time used to synchronise a master clock
GOOSE	Generic Object Oriented Substation Event
GPT	Generic Protocol Translator software, supplied by ASE
Group	Logical combination of BI (i.e. SP, DP, SI or other groups).
GSSE	Generic Substation Status Event
Hand Dressing	Facility for an operator to set manually the position of a device (acquired by other means) from the HMI at SCP level; e.g. from OPEN to CLOSE (without any impact on the “physical” position of the electrical switching device).
HMGA	Horizontal Measurement Graphical Area
HMI	Human Machine Interface Can be PACIS OI (Operator Interface) or C264 LCD (Local Control Display) or Leds, mosaic...
HSR	High Speed auto-Recloser, first cycles of AR
HTML	Hyper Text Mark-up Language Used as standard for formatting web display
HV	High Voltage (for example 30kV to 150kV)
I/O	Input/Output
ICD	IED Capability Description
IEC	International Electro-technical Commission
IED	Intelligent Electronic Device General expression for a whole range of microprocessor based products for data collection and information processing
IP	Internet Protocol
IRIG-B	Inter-Range Instrumentation Group standard format B. This is an international standard for time synchronisation based on analogue signal.
JAMMED	Invalid state of a Double Point: Occurs when the 2 associated digital inputs are still in state 0 after an user-selectable delay, i.e. when the transient state “ motion ” is considered as ended
Kbus (Kbus Courier)	Term used for the protocol Courier on K-Bus network (kind of RS422).
LAN	Local Area Network
L-BUS	Legacy Bus Generic name of Legacy or field networks and protocols used to communicate between C264 (Legacy Gateway function) and IED on field bus. Networks are based on (RS232,) 422, 485. Protocols are IEC 60850-5-103 (T103 or VDEW), Modbus Schneider Electric or MODICON
LCD	Liquid Crystal Display or Local Control Display (on C264)
LD	Ladder Diagram, one of the IEC1131-3 programming languages (language used to define configurable automation).
LED	Light Emitting Diode
LF	Low Frequency

LOC	Local Operator Console Dedicated to maintenance operation
L/R	Local / Remote
Local / Remote Control Mode	When set to local for a given control point it means that the commands can be issued from this point, else in remote control are issue for upper devices.
LSB	Least Significant Bit
LSP	Load Shedding Preselection
LV	Low Voltage
MAFS	Marketing And Functional Specification
MC	Modular Computer
MCB	Mini Circuit Breaker. Its position is associated to tap changer.
MDIO	Management Data Input/Output A standard driven, dedicated-bus approach that is specified in IEEE802.3
Measurements	Values issued from digital inputs or analogue inputs (with value, state, time tag)
Metering (non-tariff)	Values computed depending on the values of digital or analogue inputs during variable periods of time (time integration).
Metering (tariff)	Values computed depending on the values of digital or analogue inputs during variable periods and dedicated to the energy tariff. These values are provided by dedicated “tariff computer ” which are external to the MiCOM Systems.
MIDOS	Schneider Electric Connector: Used for CT/VT acquisition
MMC	Medium Modular Computer
MMS	Manufacturing Message Specification (ISO 9506)
ModBus	Communication protocol used on secondary networks with IED or with SCADA RCP. 2 versions exist with standard MODICON or Schneider Electric one.
Module	Word reserved in PACIS SCE for all electric HV devices. It groups all switch-gears, transformer, motors, generators, capacitors, …
MOTION	Transient state of a Double Point Occurs when the two associated digital inputs are momentarily in state 0 (e.g. position indication when an electrical device is switching). The concept of “momentarily” depends on a user-selectable delay.
MPC	Protection Module for Computer
MV	Medium Voltage
MVAR	Mega Volt Ampere Reactive
NBB	Numerical Busbar Protection
NC	Normally Closed (for a relay)
NO	Normally Open (for a relay)
OBS	One Box Solution Computer that provides protection and control functions with local HMI. The prime application of this device is intended for use in substations up to distribution voltage levels, although it may also be used as backup protection in transmission substations. Likewise, the OBS may be applied to the MV part of a HV substation that is being controlled by the same substation control system.
OI	Operator Interface
OLE	Object Linking and Embedding OLE is a Microsoft specification and defines standards for interfacing objects.

OLTC	On Line Tap Changing
OMM	Operating Mode Management
OPC	OLE for process control OPC is a registered trademark of Microsoft, and is designed to be a method to allow business management access to plant floor data in a consistent manner.
Operation hours	Sum of time periods, a primary device is running under carrying energy, e.g. circuit breaker is in Close state and the current is unequal 0 A.
OSI	Open System Interconnection Split and define communication in 7 layers : physical, link, network, transport, session, presentation, application
OWS	Operator WorkStation (PACiS OI)
PACiS	Protection, Automation and Control Integrated Solutions
PLC	Programmable Logic Control /Chart. Includes PSL and ISaGRAF Within the PLC-programs are defined the configurable control sequences or automations taken into account by the MiCOM Systems.
POW	Point On Wave Point on wave switching is the process to control the three poles of an HV-circuit breaker in a way, to minimise the effects of switching.
PSL	Programmable Scheme Logic
PSTN	Public Switched Telephone Network
RCC	Remote Control Centre Is a computer or system that is not part of MiCOM system. RCC communicates with and supervises MiCOM system using a protocol.
RCP	Remote Control Point Name given to the device or part used to control remotely several bay or sub-station. Usually associated with Remote/Local sub-station control. It is a SCADA interface managed by the MiCOM system through Telecontrol BUS. Several RCPs can be managed with different protocols.
Remote Control Mode	When set for a control point it means that the commands are issued from an upper level and are not allowed from this point.
Remote HMI	Remote HMI is a client of the substation HMI server. The client may provide all or part of functions handled by the substation HMI.
RI	Read Inhibit This output indicates the availability of an analogue output (e.g. during DAC converting time)
RJ-45	Registered Jack-45 A 8-pin female connector for 10/100 Base-T Ethernet network
RMS	Root Mean Square
RRC	Rapid ReClosure
RSE	Régime Spécial d'Exploitation French grid function when works are being done on a HV feeder
RSVC	Relocatable Static Var Compensator
RS-232	Recommended Standard 232 A standard for serial transmission between computers and peripheral devices.
RS-422	A standard for serial interfaces that extends distances and speeds beyond RS-232. Is intended for use in multipoint lines.
RS-485	A standard for serial multipoint communication lines. RS-485 allows more nodes per line than RS-422

RSVC	Relocatabled Static Var Compensator
RTC	Real Time Clock
RTU	Remote Terminal Unit Stand alone computer that acquires data and transmit them to RCP or SCADA. Typically it is the C964. RTU link is the TBUS.
SAT	Site Acceptance Test Validation procedures executed with the customer on the site.
SBMC	Site Based Maintenance Control mode A bay in SBMC mode does not take into account the commands issued from RCP; moreover, some of its digital points & measurements (defined during the configuration phase) are not sent anymore to the RCP (they are “automatically” suppressed).
SBO	Select Before Operate A control made in two steps, selection and execution. Selection phase give a feedback. It can be used to prepare, reserve during time, configure circuit before execution. Controls are done into a protocol, or physical (DO select with DI Select then DO execute).
S-BUS	Station Bus, federal network between PACIS devices.
SCADA	Supervisory Control And Data Acquisition Equivalent to RCC
SCD	Description file extension (SCE)
SCE	System Configuration Editor
SCL	substation automation System Configuration Language (IEC 61850-6)
SCP	Substation Control Point Name given to the device or part used to control locally several bays or sub-station. Usually associated with Remote/Local sub-station control. It is commonly PACIS Operator Interface.
SCS	Substation Control System
SCSM	Specific Communication Service Mapping
SCT	Single Counter
SER	Sequence of Event Recorder Combines SOE with accurate Time synchronization and Maintenance facilities over Ethernet communication
Server	Define in IEC61850 as: entity that provides services to clients or issues unsolicited messages
Setpoints (analogue)	Analogue setpoints are analogue outputs delivered as current loops. Analogue setpoints are used to send instruction values to the process or auxiliary device
Setpoints (digital)	Digital values sent on multiple parallel wired outputs Each wired output represent a bit of the value. Digital setpoints are used to send instruction values to the electrical process or to auxiliary devices.
SFC	Sequential Function Chart One of the IEC1131-3 programming languages (language used to define configurable automation).
SI	System Indication Binary information that do not come from external interface. It is related to an internal state of the computer (time status, hardware faults…). It is the result of all inner function (AR, …), PSL, or ISaGRAF automation.
SICU 4	Switchgear Intelligent Control Unit Control unit of an intelligent circuit breaker (fourth generation)
SIG	Status Input Group

SINAD	Signal-plus-Noise-plus-Distorsion to Noise-plus-Distorsion ratio, in dB
SIT	Status Input Double Bit
SNTP	Simple Network Time Protocol
SOE	Sequence Of Events Other term for the event list.
SP SPS SPC	Single Point Single Point Status Single Point Control
ST	Structured Text An IEC1131-3 programming languages to define configurable automation
STP	Shielded Twisted Pair
Substation computer	Bay computer used at substation level
Suppression (Automatic)	A binary information belonging to a bay in SBMC mode will be automatically suppressed for the remote control. However changes of state will be signalled locally, at SCP
Suppression (Manual)	A binary information can be suppressed by an order issued from an operator. No subsequent change of state on a “suppressed information ” can trigger any action such as display, alarm and transmission
SWR	Switch Redundant Computer C264 board Ethernet switch with redundant Ethernet
SWU	Switch Unit (Computer C264 board Ethernet switch)
T101	Term used for IEC60870-5-101 protocol
T103	Term used for IEC60870-5-103 protocol
T104	Term used for IEC60870-5-104 protocol
TBC / TBD	To Be Completed / Defined
T-BUS	Telecontrol Bus, generic name of networks and protocols used to communicate between PACIS Gateway or C264 Telecontrol Interface function and the RCP. Networks are based on RS232, 485, or Ethernet (T104). Protocols are IEC 60850-5-101 (T101), Modbus MODICON
TC	True Contact
TCIP	Tap Changer in Progress
TCU	Transformer Current Unit Computer C264 CT/VT Board : Current acquisition
TDD	Total Demand Distorsion, similar to the THD but applied to currents and with a rated current (I_n) as reference
TG	Telecontrol Gateway
THD	Total Harmonic Distorsion, sum of all voltage harmonics
TI	Tele Interface
TM	Analogue Measurement
TMU	Transducerless Measurement Unit
Topological interlocking	Interlocking algorithm, based on evaluation of topological information of the switchgear arrangement in the HV network, the switchgear kind and position, & defined rules for controlling this kind of switch (e.g. continuity of power supply)
TPI	Tap Position Indication (for transformers). Frequently acquired via a Digital Measurement
TS	Logic position

TVU	Transformer Voltage Unit (computer C264 CT/VT Board : Voltage acquisition)
UCA	Utility Communications Architecture Communication standard (mainly US) used for PACIS SBUS communication
UPI	Unit Per Impulse Parameter of counter to convert number of pulse to Measurement value. Both data (integer and scaled float) are in common class UCA2 Accumulator.
UTC	Universal Time Co-ordinates (or Universal Time Code) Naming that replace GMT (but it is the same)
VdBS	Versioned data Base System, databag generated by SCE & ready to download
VDEW	Term used for IEC60870-5-103 protocol
VMGA	Vertical Measurement Graphical Area
Voltage level	Set of bays whose plants & devices are dealing with same voltage (e.g. 275kV)
VT	Voltage Transformer Basically the electric device connected to process and extracting a voltage measurement. By extension part of a device (C264) that receives this AC value and convert it to numerical measurement value. VT are wired in parallel.
WTS	Windows Terminal Server, Microsoft’s remote desktop connection
WYE	Three phases + neutral AI values

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